

ANNUAL REPORT 1965
COOK INLET AREA
COMMERCIAL FISHERIES DIVISION
ALASKA DEPARTMENT OF FISH AND GAME

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TABLE OF CONTENTS

Introduction	1
Salmon	4
Catch by Week	6
Informational Leaflet 69, Status of the Cook Inlet- Resurrection Bay Commercial Salmon Fishery, 1965	
1965 Aerial Surveys on Set and Drift Net Fishery, South Central and North Central District.	7
Intent to Operate, 1965.	8
Total Cumulative Pack, Cook Inlet - 1965.	12
Cook Inlet Salmon Pack by Cannery - 1965.	13
Prices Paid and Fish per Case.	14
Salmon Catch by Statistical Area and Gear.	15
King Salmon Beach Survey Report.	16
Humpy Creek Research Project.	17
Informational Leaflet 74, Cook Inlet Area Pink Salmon Forecast Studies 1964-1966	
Red Salmon Smolt Studies.	19
Difference in Scale Growth between Shell Lake and Fish Creek Age 1+ Red Salmon Smolts.	20
Kenai-Kasilof Test Fishing.	21
Test Net Catches of Red Salmon, Kenai River 1962-1965.	22
Test Net Catches of Red Salmon, Kasilof River 1962-1965	24
Northern District.	25
Fish Creek Counting Tower.	26
Fish Creek Red Salmon Counts 1936-1965.	27
King Salmon.	28
Susitna River King Salmon Daily Catch Data for 1965.	29
Commercial Fish Test Fishing, Susitna Basin, King Salmon, 1965.	30

Russian River Counting Tower.	31
Fritz Creek.	32
Subsistence Fishing.	33
King Crab.	34
King Crab Catch Statistics.	34
Dungeness Crab.	36
Dungeness Crab Catch, Cook Inlet Area.	36
Seismographic Explorations, Cook Inlet.	37

INTRODUCTION

The year 1965 was not a particularly productive year for Cook Inlet from a commercial fisheries harvest standpoint. The salmon pack was the smallest since 1959. The king crab catch was but 2,774,000 pounds, also the lowest since 1959. The salmon catch is described in detail in this report. The small king crab catch can be attributed to the abandonment of Cook Inlet as a king crab fishing area by most of the large boat fishermen. Winter ice conditions, and better fishing in the Kodiak area are the basic reasons these fishermen left Cook Inlet.

The Board of Fish and Game met in Anchorage for their December meeting, giving Cook Inlet fishermen an opportunity to voice their opinions on the many proposals presented -- and the fishermen took advantage of their chance, with about 30 Inlet fishermen testifying during the public hearing. Two subjects were commented on the most: the failure of the Northern District fishery, and the proposal to combine areas H (Cook Inlet) and K (Kodiak) into one king crab registration area.

On the failure of the salmon fishery of the Northern District many fishermen blamed the drift fishery for catching the fish before they arrived in the Northern District, or they blamed the Department for not closing the fishery before the drift fishery had made the large catch that it did. Many proposals were made to curtail to various degrees the drift fishery of the Inlet -- such proposals coming from set net fishermen of the Northern District. Some fishermen were of the opinion that it is the responsibility of the Department of Fish and Game to divide the fish equally between drift gear and set net gear -- or at least, to see to it that each type of gear catches fish.

The Board of Fish and Game chose to accept a proposal from the set net fishermen of the Northern District to commence three day a week fishing on

July 11 -- the earliest date on record for such amount of fishing time since at least the early 1950's. The remainder of the gill net fishing districts of the Inlet were left at two days a week until July 18, when they are scheduled to go to three days.

The Board combined the Cook Inlet and Kodiak areas for area registration of king crab. They also made legal the use of hydraulic digging apparatus for razor clams.

At the conclusion of the salmon season the Cook Inlet staff reviewed salmon management efforts of the state since 1960 for the Inlet, and the results were so interesting that the data were published, along with considerable miscellaneous economic and biological data, as "Informational Leaflet 69", a copy of which has been incorporated into this annual report.

In late fall new funds were made available to Cook Inlet for salmon research via P.L. 88-309. Two new positions were created, and a long needed program of both pink salmon and red salmon research commenced. The use of sonar for counting salmon in silt-filled streams is to be one of the major projects. This work started in Cook Inlet in 1961, when a sonar engineer from Bendix Corporation of North Hollywood, California, came to the Inlet to make tests to determine feasibility of sonar counting of salmon. A laboratory model of a salmon counter was completed by Bendix in the spring of 1965, and it was installed at Igiugig, where clear water and large numbers of salmon combined to make an ideal test. The unit proved amazingly accurate, and it was moved to the silt-filled Kenai River, where many of its shortcomings were immediately apparent. During the winter 1965-66 Bendix re-engineered the counter, and at this writing promises to deliver a considerably more sophisticated counter to the Department for use for the summer 1966 season.

Considerable interest was shown in the possibility of a year-round diversified fishery for the lower Inlet by a number of companies during late 1965. Species eyed for exploitation included shrimp, scallops, halibut, tanner crab, king and Dungeness crab -- and salmon. A new boat harbor, re-built after the disastrous 1964 earthquake, and a new dock, both on the Homer spit, gave considerable encouragement to fishermen and processors alike. A fresh water supply from the newly planned and bonded Homer water system was expected to be completed sometime in 1966.

Seldovia, which, with Homer, has supported a year-round commercial fishery in fact, has always far surpassed Homer in fish landings -- was undergoing throes of urban renewal in 1965. One of the two king crab canneries (A.Y.R.) is expected to be dismantled and put aboard a floating processor and moved to Kodiak. The other king crab plant (Wakefield's) is expected to be allowed to run through much of the 1966 season while a new plant is being constructed. No salmon plant now exists in Seldovia.

Oil exploration and production demanded much time and effort from the Cook Inlet staff in 1965. The oil industry has expanded operation into several areas, including waters of the Inlet itself, and the ever-present problem of possible loss of fisheries resources because of activities of the oil industry kept the staff continually issuing permits and inspecting operations. The Department will eventually have to employ a full-time biologist to work with the oil industry in this area.

SALMON

The 1965 salmon season for Cook Inlet resulted in a pack that appeared not far from normal for an odd year ~~at~~ 130,435 cases (average odd year pack since 1959 is 150,000 cases). However, a close look at the catch by species, by area caught, and the catch by gear, reveals an extremely unusual situation.

Drift fishermen took approximately 70 per cent of the salmon catch, set netters 22 per cent, and seiners 8 per cent. Normal percentages are about 45 per cent for drifters, 38 per cent for set net gear, and about 17 per cent for seines.

Further, the distribution of the catch was skewed. The Northern District normally takes about 12 per cent of the salmon caught in Cook Inlet: in 1965 the catch for this district was about 3 per cent.

The catch by species was also considerably off from the norm, with red salmon comprising about 69 per cent of the total. Since reds average about 27 per cent of the total catch (odd and even years combined) it is obvious that the red catch was considerably above the expected.

Fish behaved differently than usual. Many experienced drift fishermen reported that salmon were scattered throughout the Inlet at a time when they should have been concentrating to the east of Kalgin Island. Many reports were made of salmon in considerable numbers traveling south, or traveling from east to west, or west to east. The fish appeared to be confused.

Heavy fog and calm weather during fishing days during the peak of the run made it difficult for drift fishermen to navigate. If the weather had been clear and calm the catch would have probably been considerably greater.

Many suggestions have been advanced for the peculiar behavior of the fish. Tides were such that fish were not moved up the Inlet rapidly as is normal. Considerable northerly weather occurred, which probably had an influence on

the movement of fish. Bottom contours of the Inlet are probably different than they were in the past as a result of the 1964 earthquake, and this probably has changed currents of the Inlet, which could well influence movements of returning fish. Temperatures of the Inlet water were reported 8 degrees lower than the previous year -- this from one of the drilling platforms in mid-Inlet.

The possibility that some of the 60 million or so red salmon bound for the Bristol Bay area wandered into Cook Inlet should perhaps be given consideration.

On the 22nd of July a field announcement was made postponing the next fishing day until July 27 (instead of the 26th) and cutting fishing time from 24 to 12 hours. Fishing time for the 29th was kept at 12 hours, and then time was extended again to 24 hours for the 2nd of August, and on August 4th, when many fishermen had left the Inlet, and when the bulk of escapement had been achieved, three 24-hour periods a week were announced. The table below is based on information available to the management staff during the fishing periods, and shows the catch, the average catch for the week, and gives a picture of how the season developed. Perhaps the most noteworthy point is the fact that the catch built in a normal fashion until July 15 when 435,000 fish were taken, and then it dropped, as if the peak had hit. The catch for the 19th was but 278,000 fish. But on the 22nd, instead of the catch continuing to drop, as was expected, and as appeared logical, nearly half a million fish were taken. It was at this point that fishing time was curtailed.

Another peculiar situation developed during the season -- one that had not been seen in previous years. Much of the east side beach south of the Kasilof River had a streak of clear water extending several hundred feet out during many of the fishing days. This unquestionably reduced the set net catch for this beach, for fish could clearly see the nets. Set netters with 15 years' experience on this beach cannot recollect this happening in any previous year.

CATCH BY WEEK - 1965

WEEK	FISHING PERIODS	CATCH REPORTED TO DEPT.	AVERAGE CATCH FOR WEEK FOR PAST YEARS
27	June 28, Monday July 1, Thursday	18,731) 35,455)	54,000 - 50% reds 12,000
28	July 5, Monday July 8, Thursday	98,824) 82,000)	200,000 - 60% reds 406,000
29	July 12, Monday July 15, Thursday	220,600) 435,000)	655,000 - 70% reds 712,000
30	July 19, Monday July 22, Thursday	278,545) 481,816)	760,000 - 80% reds 541,000
31	July 27, Tues.(12 hrs) July 29, Thurs.(12 hrs)	50,000) 63,000)	113,000 - 54% reds --

The following 39 page report on the status of salmon in the Cook Inlet Area reviews the catches, the fishing conditions, economics, and management considerations as they existed after the 1965 salmon season. The 1965 catch information included in the report were estimates. Actual figures have been inserted in this report that is included as part of the 1965 Annual Report.

NOTE: This report was prepared before the final statistical report on salmon was received from Juneau; therefore some figures in the report will be slightly off. True figures for the 1965 season catch may be found in the table on SALMON CATCH BY STATISTICAL AREA AND GEAR, 1965.

Informational Leaflet 69

STATUS OF THE COOK INLET-RESURRECTION BAY COMMERCIAL SALMON FISHERY, 1965

By:

Jim Rearden
Division of Commercial Fisheries
 Homer, Alaska

October 14, 1965

STATE OF ALASKA
WILLIAM A. EGAN - GOVERNOR
DEPARTMENT OF
FISH AND GAME
WALTER KIRKNESS - COMMISSIONER
SUBPORT BUILDING, JUNEAU



TABLE OF CONTENTS

Highlights.	1
Abstract.	2
Introduction.	5
The Management Area.	5
Fishermen and their Catch.	5
Map of Cook Inlet-Resurrection Bay Management Area. . .	6
The Districts.	7
The Northern District.	7
The North Central District.	9
The South Central District.	9
Table 1, Percentage of Cook Inlet Catch by Gear. . .	11
The Southern District.	12
The Kamishak Bay District.	13
The Outer District.	14
The Eastern District.	14
The Salmon.	15
King Salmon.	15
Red Salmon.	16
Coho Salmon.	17
Pink Salmon.	18
Chum Salmon.	19
Table 2, Salmon per Case, Cook Inlet.	21
Economics.	22
Table 3, Salmon Gear License Sales, Cook Inlet. . .	24
Table 4, Percentage of Salmon Caught by Resident and Non-resident Fishermen.	25
Table 5, Independent and Cannery Owned Boats. . . .	26
Table 6, Average Gross Income of Cook Inlet Fisherman.	27
Management of the Cook Inlet Salmon Fishery. . . .	28
Table 7, Number of Emergency Orders, Salmon. . . .	29
Explanation of Tables 8 through 14.	30
Table 8, Total Catch, All Districts, 1954-1965. . .	32
Table 9, (Catch) Northern District, 1954-1965. . .	33
Table 10, (Catch) North Central & South Central Districts Combined, 1954-1965.	34
Table 11, (Catch) Southern District, 1954-1965. . .	35
Table 12, (Catch) Kamishak Bay District, 1954-1965. .	36
Table 13, (Catch) Outer District, 1954-1965. . . .	37
Table 14, (Catch) Eastern District, 1954-1965. . .	38
The Future.	39

HIGHLIGHTS

During the first six years of state management of the Cook Inlet-Resurrection Bay Area:

.....over five and a quarter million more salmon were caught than during the previous six years.

.....fishermen received over \$5 million more for their salmon than during the previous six years.

.....pink salmon catches increased 39 per cent, coho salmon catches increased 30 per cent, red salmon catches increased 24 per cent, and chum salmon catches increased 12 per cent, as compared with the previous six years.

.....as compared with the six years prior to state management, catches in the Northern District increased by 10 per cent, in the North Central and South Central Districts by 29 per cent, in the Kamishak Bay District by 224 per cent, in the Outer District by 69 per cent. Catches decreased by 10 per cent in the Southern District and 88 per cent in the Eastern District.

ABSTRACT

Alaska has managed its salmon resources for six seasons. This report compares catches in the Cook Inlet-Resurrection Bay Area for the six years since the state obtained control of fish and game (1960-65) with the previous six years (1954-59)

Salmon caught in the seven districts from 1954 to 1959 totalled 19,639,306: between 1960 and 1965, 24,986,605, for an increase of 27 per cent. Harvest increased for all species except for king salmon. Greatest increase occurred with pinks, for a 39 per cent rise. The coho catch increased 30 per cent, the red catch increased 24 per cent, and the chum catch increased by 12 per cent.

In the past six years 150 set netters in the Northern District have taken 10 per cent more fish than during the previous six years. This district accounted for 11 per cent of all salmon taken within the entire management area during the past six years. Pink salmon accounted for 42 per cent of the catch in this district during the past six years.

In the North Central and South Central Districts (combined for this report) 703 resident and 138 non-resident fishermen fish. Since 1960 69 per cent of the salmon taken in the Cook Inlet-Resurrection Bay Management Area have been caught in these two districts, and 29 per cent more fish were caught in these districts between 1960 and 1965 than during 1954-59. Greatest increase was in pink salmon, with 39 per cent more individuals taken. Pinks comprised 37 per cent of the catch, reds 36 per cent, and chums 20 per cent. Sixty per cent of the total catch may be made in these districts during two or three 24-hour fishing periods at the peak of the run. The Kenai River, in the North Central District, is probably the most important red salmon producer in the Cook Inlet Management Area.

The Southern District is fished by 12 set net fishermen and from 10 to 50 seiners. Since 1960 7 per cent of the Cook Inlet-Resurrection Bay Area catch has been made here. A decrease of 10 per cent occurred in the catch from 1954-59 to 1960-65. Pink salmon make up 91 per cent of the catch in this district, and the fish caught here are bound for local streams. Red salmon, taken mostly by set netters, are bound generally for streams in more northerly areas of the Inlet.

The Kamishak Bay District, fished exclusively by seines, contributed 1 per cent of the total salmon catch for the management area. 49 per cent of the fish were pinks and 49 per cent were chums. Because of harsh weather, rocks and reefs, and its remoteness, this is the most difficult district in the area to fish for salmon.

The Outer District, fished by seines only, has produced an average of 11 per cent of salmon in the management area since 1960. 69 per cent more fish were caught from 1960 to 1965 than from 1954-59. Pinks comprise 81 per cent of the catch and chums 18 per cent, from this district. The March 1964 earthquake adversely affected pink catches in the Outer District in 1965; the chum catch for 1967 is expected to be weak from the same cause. Port Dick is the most productive single area in the District.

The Eastern District is the least important commercial salmon producing district of the management area, and since 1960 has produced an average of but .3 per cent of the salmon harvest.

King salmon reached a peak catch of 187,000 in 1951 and then the catch declined until 1961 when fishing time was curtailed. Since 1964 salmon season has been set so that approximately 90 per cent of Cook Inlet's king salmon have reached spawning grounds before the season opens.

Cook Inlet's red salmon catch is the second largest in Alaska, and the general trend for this catch has been upward since 1960. Major red salmon drainages are the Kenai and Kasilof Rivers. Numerous small drainages that produce red salmon probably contribute appreciably to the catch.

Coho salmon in Cook Inlet are characterized by an even-year odd-year fluctuation, the strong runs occurring during even years. Since 1960 39 per cent of the Inlet's cohos have been taken in the Northern District.

Pink salmon, which are now abundant during even numbered years, were relatively unimportant in the Cook Inlet salmon pack of the late 1930's. Since 1952 pinks have increased steadily. The 1964 pack was 188,800 cases. The tremendous numbers of pinks that arrive in the gill net areas of Cook Inlet tend to mask catch figures for other species. The largest numbers of pinks are caught in the North Central and South Central Districts.

Pinks, arriving in abundance simultaneously with strong runs of reds, chums, and cohos, may overwhelm present Cook Inlet processing facilities. ▲

Chum salmon packs for Cook Inlet have increased markedly in recent years, and the 1964 chum pack of nearly 136,000 cases was the largest ever packed in the Inlet. No explanation is available for the decrease in chums in 1965. Chum runs were almost uniformly weak all along the Pacific coast in 1965.

Cook Inlet has too many salmon fishermen. Fishing time must be held to two 24-hour fishing periods a week during much of the season in order to insure escapement. So much fishing gear is present that it is conceivable that under unusual circumstances the fishery could be damaged during a 24-hour fishing period.

Canneries must handle large quantities of salmon twice a week, and then may lay idle on other days. During weak runs canneries may be unable to buy sufficient fish for profitable operations.

The individual average annual gross income, all Cook Inlet salmon gear license holders, from 1959-64 was \$3,313.

In 1962 non-residents caught 13 per cent of Alaska's salmon; in 1963 28 per cent, and in 1964 20 per cent.

Prior to 1947 there was no important drift fishery. Drift gear peaked in 1951 with approximately 560 boats. Percentage of catch by various types of gear fluctuates. Since elimination of traps in 1959, the average percentage of salmon taken by set nets has risen by 16, while the average percentage of drift gear catch has risen by 4.

Since 1958 set nets have taken an average of 45 per cent of the Inlet's salmon, drift gear 35 per cent, and seines 20 per cent.

The main management tool of the state since 1960 has been to open and close seasons or areas as demanded by abundance or lack of salmon. In areas of clear water spawning streams this is based upon observed escapement. In the silty portion of the Inlet catch by week is compared with catches made for the same week of former years in order to establish the relative size of the salmon runs -- and this provides a basis for estimating escapement. Counting towers and test fishing are used in conjunction with these comparisons.

Little basic salmon research has been done in Cook Inlet. A federal aid research program has been approved to provide basic biological data on the Cook Inlet sockeye stocks. Research will continue on a sonar fish counting device that will count escapement into silty streams, and a racial study of sockeye of the Inlet will be made to determine, if possible, if the fishery can be managed to protect or harvest individual races. Estimates will be made of out-migrations of smolts, with the goal of forecasting returning runs of adults.

A pink salmon run forecast study, commenced in Cook Inlet in 1962, will be expanded and continued.

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INTRODUCTION

Alaska, as a state, has managed its salmon fisheries for six seasons. During this time the annual pack for the state has more than doubled the 1.7 million cases packed in the last year of federal management. In this six years a fresh approach to salmon management has been employed; fresh, that is, to Alaska. Basically this approach has stressed flexibility, with authorization for certain field personnel to open and close areas and seasons as conditions demand.

The Alaska Board of Fish and Game has fostered and strengthened this means of management, the authorization of which is in the law that established the Alaska Department of Fish and Game in the first State Legislature.

Six years is sufficient time for a realistic evaluation of the results. A direct comparison of state managed harvests with those made during the previous six years is the means used in this report to make this comparison.

This report will also make available for the first time in coherent form data on the Cook Inlet-Resurrection Bay fishery frequently requested of the Department of Fish and Game by fishermen, processors, economists, legislators, and others.

THE MANAGEMENT AREA

The Cook Inlet-Resurrection Bay Management Area (hereafter referred to as the Cook Inlet Area) includes all waters of Cook Inlet and Resurrection Bay north of Cape Douglas at the northeastern edge of Katmai National Monument, and west of Cape Fairfield, including the Barren Islands. The area embraces approximately 50,000 square miles, a region about the same size as the state of New York.

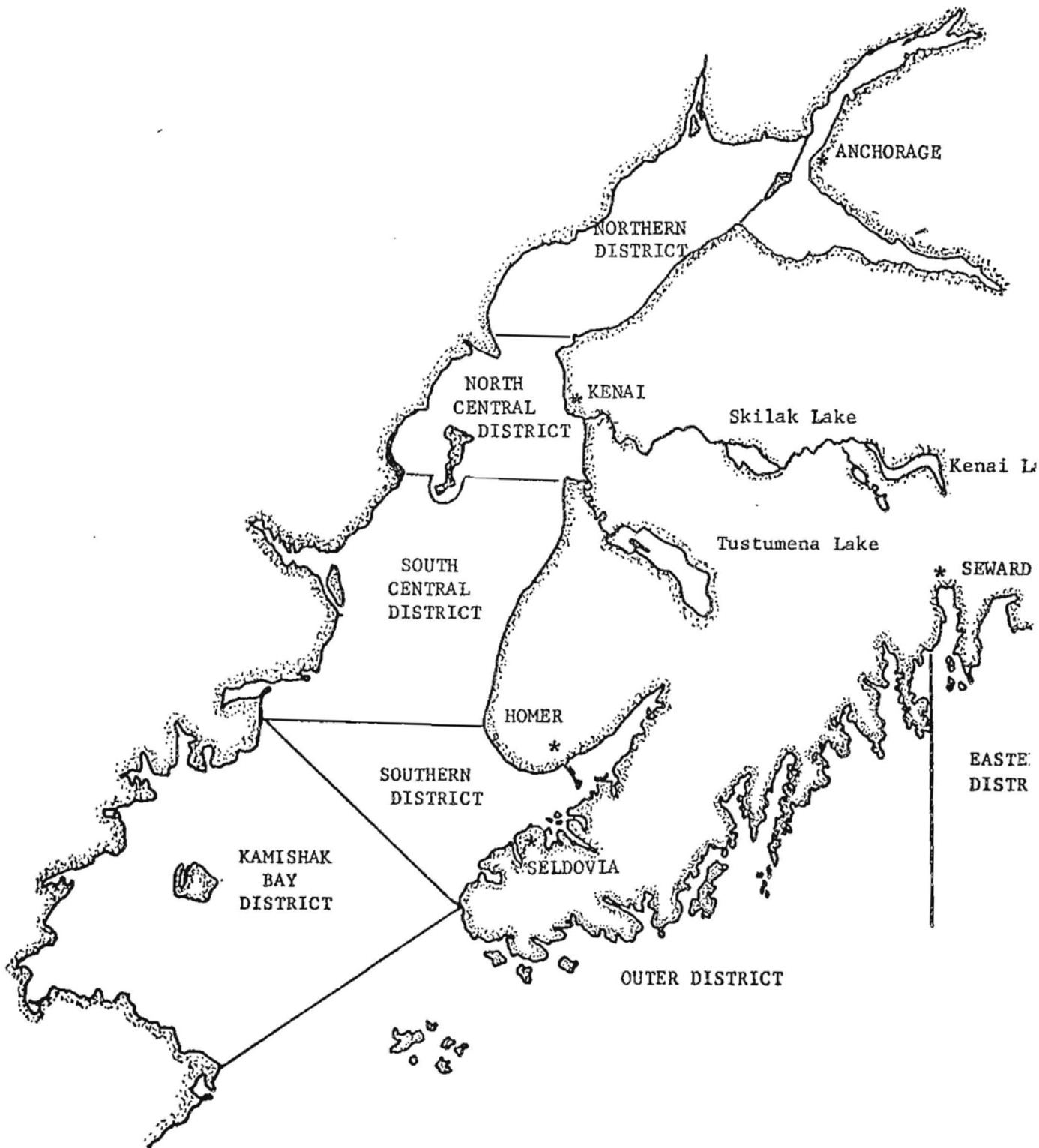
Since 1960 a commercial fisheries management staff of one Area Biologist and two Assistant Area Biologists have been charged with the management of all commercial fisheries within this area, including salmon, king and Dungeness crab, shrimp, razor clams, and fresh water species used for commercial purposes.

Temporary personnel authorized annually since 1964 include 5 man months allowed for test fishing, 19 man months for management purposes, and 3 man months for a single engine pilot.

FISHERMEN AND THEIR CATCH

An average of 1097 gear licenses were issued during the years 1960-65 (see Table 3), of which 602 were for set nets, 401 for drift nets, and 94 for hand purse seines. The approximately 150 fishermen in the Northern District comprise about 13 per cent of the Inlet's salmon fishermen, and since 1960 they have caught an average of 11 per cent of the Inlet's salmon. An average of 440 set netters and 401 drifters in the North Central and South Central Districts comprise approximately 77 per cent of the Inlet's fishermen, and since 1960 they have caught an average of 69 per cent of the Inlet's salmon. An average of 94 seiners and 12 set netters, or 10 per cent of the Inlet's salmon fishermen, caught an average of 19 per cent of Cook Inlet's salmon in the Southern, Kamishak Bay, Outer, and Eastern Districts between 1960 and 1965.

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
COOK INLET - RESURRECTION BAY AREA



THE DISTRICTS

The Cook Inlet Area is divided into seven fishing districts, which, with one exception, have remained basically the same under state management as under federal jurisdiction: the one exception being the former Western District, which was combined with the present Outer District in 1961.

The salmon catch for the entire seven districts from 1954 to 1959 totalled 19,639,306: between 1960 and 1965 a total of 24,986,605 salmon were taken for an overall percentage increase of 27 (see Table 8).

Harvest of all species except for king salmon increased. The greatest increase of catch occurred with pink salmon, which rose from 8,591,764 to 11,960,393, for a 39 per cent rise.

Coho salmon increased by 30 per cent, from a 1954-59 catch of 1,206,095 to a 1960-65 catch of 1,571,599. Reds increased 24 per cent, from 5,407,679 to 6,695,537. The least increase in catch was shown by chums, which increased by 12 per cent from 4,178,237 to 4,660,969.

The Northern District, all the waters of which are silty, include that area north of Boulder Point, excluding Turnagain and Knik Arms. Of the approximately 150 set netters within this district about 142 are resident and 8 are non-residents (figures in this report referring to numbers of fishermen are for gear license holders only, and do not include helpers). No mobile gear has fished here since 1953; prior to 1953 drift nets were allowed throughout the district. The Northern District is the only one of the seven in the Cook Inlet Management Area which has no mobile gear.

Ten per cent more salmon were caught during 1960-65 than were taken from 1954-59 in this district. The greatest increase was in cohos, with 34 per cent more of this species taken during the past six years than during the period 1954-59. The greatest reduction was for king salmon, which decreased 68 per cent. Curtailment of king salmon fishing starting in 1961, and even greater curtailment starting in 1964, for conservation reasons, brought about much of the decline in king catch.

Fishermen of the Northern District rely heavily upon pink salmon, which come in strength only during even numbered years and comprise about 42 per cent of the catch, all years averaged. Next most important species is the red salmon, which comprises 21 per cent of the catch. Cohos are nearly as important as reds in this district, with 19 per cent of the catch being made up of this species.

There was little shift in the relative importance of species caught between the two periods being compared: cohos increased in relative importance by 3 per cent, while chums decreased by 3 per cent. Reds remained almost at the same relative importance. Kings, which comprised 4 per cent of the total catch 1954-59, decreased in relative importance to 1 per cent of the total catch for the 1960-65 period.

The largest catch made in the Northern District during the 12 years was in 1964, when 1,041,704 salmon were caught. This figure would have been higher if canneries of the Inlet had been capable of processing fish at a faster rate; during the height of the 1964 season the cannery that processes the bulk of the

Northern District salmon required fishermen to limit their catches for about two weeks, at a time when a strong run of pinks was available for harvest.

The smallest catch made in the Northern District during the 12-year period occurred in 1965 when approximately 66,539 fish were taken: it is probable that this is the smallest catch made in this district since the early days of the fishery. The small catch reflected weak chum and coho runs, the usual off year on pinks, and a weak run of red salmon into drainages of the Northern District. Coho and chum runs were weak throughout the Inlet in 1965, and runs of these species, particularly of chums, were weak throughout most of the Pacific Coast this year.

The greatest dollar value of the fishery to fishermen of the Northern District during the period under study occurred in 1964, when \$685,765 was paid to these fishermen for their salmon. The next greatest value (\$678,895) occurred in 1960, and the third greatest value (\$631,590) occurred in 1962. The average annual income for this district 1960-65 was \$431,000.

Parts of the Northern District are difficult to fish because of extreme tides that average close to 30 feet of change between high and low water. Mud flats extend for some miles at low water in the northern section of the district, and set nets fished over these flats are effective only about half of the time: the rest of the time they go dry. Further, particularly in the northern and western portions of the district, violent winds that funnel out of Turnagain Arm combine with the rapidly moving tidal waters to create severe wave conditions that can make effective fishing impossible.

Although the "Turnagain winds" do make fishing difficult at times, it appears that a combination of winds -- Turnagain winds included -- and large tides, may create conditions favorable for catches of salmon in this particular area.

The bulk of the salmon caught in the three major gill net fishing districts of the Inlet (which includes the Northern District) are typically taken during a relatively brief time. During some salmon seasons 60 per cent or more of the entire Inlet gill net catch may be taken during two or three 24-hour fishing periods.

If wind, tide, salmon, and fishing time do not occur simultaneously in the correct combination a small segment of the fishery on the northwest shore of this district can fail.

Major drainages of the Northern District include the Chuit River, Beluga River, the Susitna River, the Little Susitna River, Fish Creek (Knik Arm) that drains the Big Lake system, the Matanuska River, Swanson River, Resurrection Creek, and Chickaloon River. Of these, the Susitna River is by far the largest and has the greatest potential for salmon production. An impassible barrier exists about 130 miles up the Susitna River at Devils Canyon, and salmon are not found beyond this point. Vast areas that are probably suitable for spawning exist above Devils Canyon, but the cost of making this area available to salmon will probably prohibit development, at least for some years, of the area into salmon production. Presently Devils Canyon is a site favored for construction of a power dam.

The Susitna River itself is silty, and many of the streams feeding it are silty; it is impossible to observe salmon escapement into these streams. It is

highly probable that the vast drainage of the Susitna Basin presently available for salmon spawning is under-utilized for this purpose. Until a means of counting spawning runs of salmon into silty streams is devised, estimates of the escapement of salmon into the Susitna and other silty drainages of Cook Inlet must be based upon the size of the commercial catch, and upon test fishing at or near the mouths of such streams during salmon runs. Since 1964 approximately 26.5 man months of management annually has been devoted to the Northern District.

The North Central District includes the area between the latitude of Boulder Point and the latitude of the marker at the south limit of the closed area at the Kasilof River, including the waters adjacent to Kalgin Island.

The South Central District includes that area between the latitude of the marker at the south limit of the closed area at the Kasilof River and the latitude of Anchor Point, excluding the waters adjacent to Kalgin Island.

For purposes of this report these two districts are considered together. Salmon harvested in these districts are of the same stocks, and primary fishing gear for both districts includes both set net and drift nets. Drifters frequently fish near the boundary between these districts, and then arbitrarily indicate one district or the other as the source of their catch. Further, depending largely upon tides and weather, the drift catch varies from year to year between these districts.

Of the average of 440 set net fishermen and 401 drifters who fished these districts 1960-65, about 703 were residents and 138 were non-residents. From two to six seine boats commonly fish for about two weeks annually in Chinitna Bay, the only portion of these districts open to seining.

Between 1960 and 1965 an average of 69 per cent of the salmon taken in the Cook Inlet Area were caught in these two districts, while between 1954 and 1959 the average was 62 per cent of the total.

Twenty-nine per cent more fish were caught in these districts between 1960 and 1965 than were taken 1954-59. The greatest increase was realized in pinks, with 39 per cent more individuals of this species taken during the past six years than during 1954-59. As expected, the greatest percentage reduction was for king salmon, which decreased 61 per cent.

Pink salmon made up 37 per cent of the total catch for the years 1960-65, and 35 per cent of the 1954-59 catch. Red salmon for the six years 1960-65 almost equalled pinks in total numbers, comprising 36 per cent of the total: chums are the third most important species for these districts, making up 20 per cent of the catch 1960-65.

There was little shift in the relative importance of species caught between the two six year periods: chums decreased from 22 per cent to 20 per cent, pinks increased from 35 per cent to 37 per cent, while cohos and reds remained virtually the same in relative importance.

The largest catch made in the North Central and South Central Districts during the 12 years under consideration was in 1964 when 4,697,570 salmon were caught. This figure would be higher, but canneries in the area, for various reasons, refused to purchase fish caught during the peak of that season.

The smallest catch was made in 1959, when 802,651 salmon were caught.

The greatest dollar value for these two districts occurred in 1962, when approximately \$3,385,969 was paid to fishermen of these districts for their salmon, and the least dollar value occurred with the small catch of 1959 when \$943,270 was paid to fishermen. The average gross amount paid fishermen in these districts 1960-65 was \$2,406,000.

Normally, most waters above the latitude of Ninilchik are silty, which makes gill net fishing in these waters quite effective. The normal summer winds are from the southwest, with only occasional northerly winds. Tidal rise and fall within these districts varies from about 18 feet to nearly 24 feet in the northerly section of the North Central District.

Salmon move through the North Central and South Central Districts in a generally predictable pattern. Chum salmon are rarely caught on the east side beaches, for example. Some tide rips, up which salmon move in some concentrations, harbor more red salmon than chums, and vice versa.

All five species of salmon may be found in these districts simultaneously, but each species has a normal period of greatest abundance. The early kings can be expected in late May: these fish are bound mostly for the Susitna River and other drainages of the Northern District. Early red salmon (locally called "bluebacks") bound for the Kasilof River, and apparently for some minor systems along the east side of the Northern District, appear in early June, and run until the third week of that month.

Shortly after June 25 red salmon increase rapidly, reaching a peak in abundance usually between about July 18 and 22. The red salmon are followed by the chums, and the chum run peaks within a very few days of the peak of the red run. In years of great abundance of pinks, they are found in large numbers from about July 18 until after July 25: during some years pinks continue to arrive in strength into the first week of August.

Coho salmon peak in late July in these districts, and this species continue to appear in decreasing numbers throughout the fall months. Fresh run fish of this species may be found in these districts as late as December.

A high percentage of the total catch in these two districts may be made during two or three single 24-hour fishing periods after about July 15, particularly in odd-numbered years when few pink salmon are taken: it is not uncommon for 60 per cent of the catch for these districts to be made during two or three such fishing days.

The proportion of catch varies between set net and drift gear, depending largely upon weather, tides, and the species of fish involved (see Table 1, Percentage of Catch by Gear). In years when strong southwesterly winds and large tides occur, red salmon bound for the Kenai and Kasilof Rivers are pushed onto the beach and/or into the Northern District, from whence they follow the beaches attempting to find their home streams: at such times the set net gear on the east side beaches make large catches, and drift catches fall off.

TABLE 1

PERCENTAGE OF COOK INLET SALMON CATCH BY GEAR, 1945-1964

	<u>1945</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>
Seine	33	28	22	12	12	7	12	23
Drift			.17	5	21	34	37	23
Set Net	23	28	31	36	26	22	21	26
Trap	44	44	46	47	41	37	30	28
	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
Seine	20	8	42	6	20	23	14	17
Drift	31	24	29	33	47	23	31	26
Set Net	34	36	16	30	24	35	55	57
Trap	15	32	13	31	9	19		
	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>			
Seine	18	30	19	19	8			
Drift	50	25	46	35	70			
Set Net	32	45	35	46	22			

Chinitna Bay, on the southwesterly corner of these two districts, has clear water, and catches there are largely chums, which seem to move into this bay briefly before continuing on up the Inlet. Red salmon and coho salmon are taken in fair numbers here also.

Strong tidal action along the beaches of much of these two districts makes it difficult for fishermen to anchor set nets offshore. However, a few locations on the east side beaches between Ninilchik and Cape Kasilof (locally called "Humpy Point") permit use of offshore nets. The largest concentrations of such nets is found from the northerly marker at the mouth of the Kasilof River to the north. Few offshore nets are seen north of the Kenai River to Boulder Point, the northerly boundary.

During the normal season drift fishermen usually start fishing east of Chisik Island, and as the season progresses, they move east and north, following concentrations of fish, until during the latter part of the run, the bulk of drift fishing boats are almost wholly within the North Central District, east of Kalgin Island. Many drifters find it worthwhile to drift as far north as the Boulder Point boundary.

The Kenai and Kasilof Rivers are the most important drainages in these districts, and they are the sole important drainages utilized by commercially exploited salmon on the east side of these districts. The Kenai River is probably the most important producer of red salmon in the Cook Inlet Management Area. Kalgin Island stream supports a small run of reds. On the west side of the Inlet at least six drainages support small runs of red salmon, while all told about 14 different streams on the west side of these districts contribute salmon of various species and numbers to the commercial fishery.

Since 1964 approximately 16.5 man months of management effort annually has been devoted to the North Central and South Central Districts.

The Southern District consists primarily of Kachemak Bay, and includes Port Graham and Seldovia Bay. About 12 set net fishermen fish for salmon within the Southern District at Port Graham, Seldovia Bay, Barabara Point to Kasitsna Bay, and at Halibut Cove. In addition the highly mobile seine fleet harvests the bulk of salmon taken here: during a season anywhere from 10 to 50 seiners may be found within this district.

Since 1960 an average of 7 per cent of the salmon taken in the management area has been caught in the Southern District; between 1954 and 1959 an average of 9 per cent of the fish were taken here. A decrease of 10 per cent in the size of catch from the 1954-59 period occurred during the years 1960-65. Fewer salmon of all species except for pinks were taken; the pink catch increased by 13 per cent, while the chum catch was reduced by 89 per cent, the coho catch by 21 per cent, the red catch by 40 per cent, and the king catch by 90 per cent.

A considerable shift in relative importance of species occurred in the Southern District between the periods under consideration. Pink salmon comprised 73 per cent of the 1954-59 catch, while between 1960-65 they comprised 91 per cent of the catch. Chums dropped from 18 per cent to 2 per cent. Reds dropped from 8 to 5 per cent.

The reduced catch as well as the shift in relative importance in species for 1960-65 is at least a partial reflection of the elimination of the very effective Bluff Point trap.

The average annual value of salmon caught in the Southern District 1960-65 was about \$133,000: the average value 1954-59 was \$137,000.

Today the set net fishermen of this district catch most of the red salmon, while the seiner relies mostly upon pink salmon. The reds taken here for the most part are bound for streams further up the Inlet. Pinks are bound mostly for Port Graham stream, Seldovia River, Tutka Bay Lagoon stream, China Poot stream, and Mallard Bay stream -- all productive clear water drainages within the district.

Since 1964 approximately 10 man months of management and research (4 months research) effort annually has been devoted to the Southern District.

The Kamishak Bay District includes the area from near the south entrance to Chinitna Bay south along the coast to Cape Douglas, which is within the northeast section of the Katmai National Monument. No complete marine charts are available for this uninhabited, reef and rock-strewn area. High winds accompanied by heavy seas are common. It is a difficult area in which to travel, much less fish, and few fishermen are willing to venture into the area for salmon. Cannery operators are reluctant to provide tender service for fishermen in the area when tenders can be used to haul fish from other districts.

Seines are the only type of salmon gear used. During 1954 and 1958 no salmon fishery existed in the district. Since 1960 the district has produced an average of 1 per cent of the total fish caught in the Cook Inlet management area. Forty-nine per cent of these fish were pinks and 49 per cent were chums.

The average annual value of the catch from this district 1960-65 was \$21,500 the average 1954-59 was \$7,000.

This district is unquestionably the most difficult of the seven within the management area to fish for salmon. At least half of a fisherman's time is spent awaiting weather. Because of the light fishing pressure, and the constant weather problem it has been the policy of the Board of Fish and Game to allow seven day a week fishing within this district for the past several years. With few exceptions no stream markers are posted. If a harvest of salmon is to be taken from the district fishermen need every possible advantage.

Major drainages within the district include Kamishak River, Little Kamishak River, Strike Creek, McNeil River (famous for brown bears, and a bear refuge where observers may see bears fishing for salmon), Chenik stream and lake, Amakdedori stream, Bruin Bay stream, Cottonwood Bay stream, and Iniskin Bay stream. Normally the chum run at McNeil River arrives about July 10. After that pinks arrive at other systems from Rocky Cove south. By late July and early August chums arrive at Cottonwood and Iniskin Rivers, with fresh fish arriving well into September in most years.

Some drainages of the district are silty -- as Kamishak and Little Kamishak Rivers. McNeil River may become muddy with heavy rains. Iniskin and Cottonwood Bays are often silty, making it difficult to see fish for seine operations.

Since 1964 about half a man month of salmon management effort has annually been devoted to the Kamishak Bay District.

The Outer District includes that stretch of coastline from Point Adam, at the very southwest tip of the Kenai Peninsula, to the latitude of Bear Glacier, which is adjacent to Resurrection Bay. This is an area of many fiord-like bays and shore often precipitous streams, some of which are glacier fed.

Seines are the single type of salmon gear allowed, and probably most of the seine fishermen who license in Cook Inlet fish at least part of each season in the Outer District. Since 1960 the Outer District has produced an average of 11 per cent of the total numbers of individual salmon caught in the Cook Inlet Area: during 1954-59 it also produced an average of 11 per cent of the salmon.

Sixty-nine per cent more salmon were caught in this district between 1960 and 1965 than during 1954-59. Pinks (81 per cent), and chum salmon (18 per cent) are the important species for the district. The relative importance of the various species changed very little between the two periods under consideration.

Pink salmon production in the Outer District for the 1965 season was adversely affected by the March 27, 1964 earthquake. It is expected the 1967 chum run will also be weak as a result of the earthquake.

The average value of the salmon catch in this district to fishermen 1960-65 was \$287,000; 1954-59 average was \$151,000.

The most productive area in the Outer District is Port Dick, followed by Windy and Rocky Bays, Port Chatham, the Nuka Island area, and Aialik Bay.

Because the highly productive streams are clear, and salmon may be observed during aerial surveys, the Outer District lends itself to relatively intensive management methods. When spawning escapement is judged sufficient, surplus fish can be harvested: when escapement is weak, the area can be closed to fishing. Since 1964 approximately 6 man months of salmon management and research time annually has been devoted to the Outer District.

The Eastern District is the least important commercial salmon producing district in the management area: it extends from the latitude of Bear Glacier (where it adjoins the Outer District), includes all of Resurrection Bay and Day Harbor, and ends at the latitude of Cape Fairfield, which is the easternmost boundary of the management area. There are few streams within the district, and these produce mainly pink, chum, and coho salmon. A small run of red salmon is found at Bear Lake at the head of Resurrection Bay. Seines and troll gear only are allowed for the taking of salmon.

The few commercial salmon fishermen who fish from Seward rely mostly on the Outer District, and expect to return to Seward and "scratch" fish for silvers and late pinks and chums in Resurrection Bay in late August and into September.

In recent years large numbers of sports fishermen have harvested a high proportion of the silver salmon entering Resurrection Bay; prior to 1960 this fishery was virtually non-existent. This shift in fishing pressure from commercial to sports type gear, and the availability of better fishing in the Outer District and other areas of Cook Inlet has caused most of the Seward salmon fishermen to all but abandon the Eastern District during most of the salmon season in late year

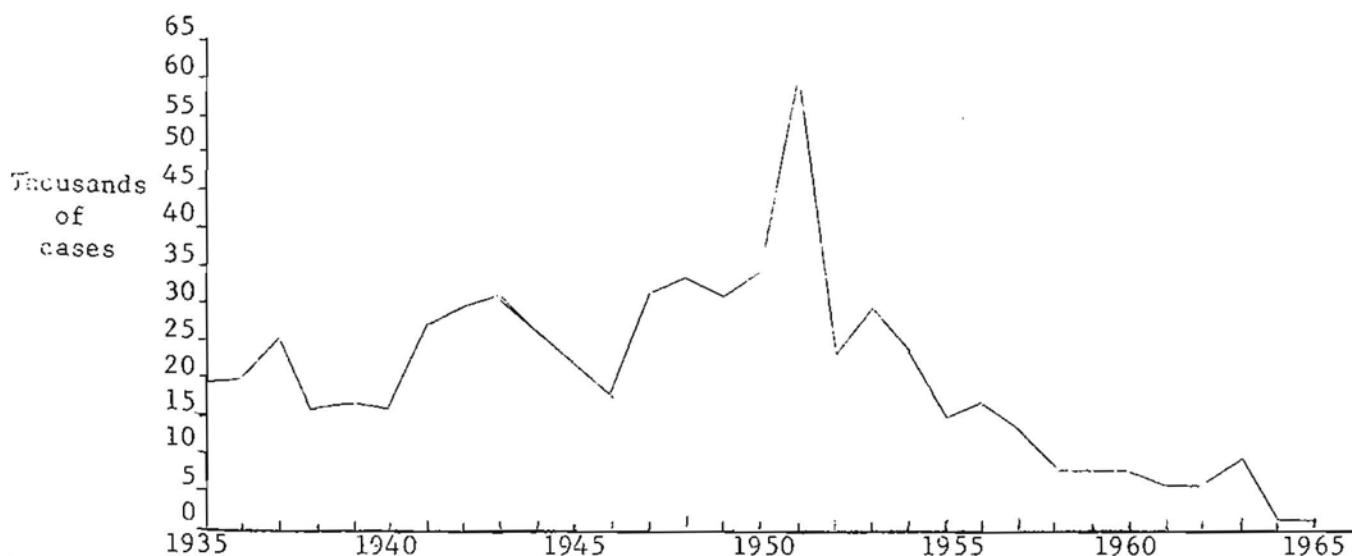
Since 1960 the area has produced an average of but .3 per cent of the total fish taken within the management area; during 1954-59 it produced an average of .9 per cent. The average annual value of commercially harvested salmon sold in the district since 1960 was \$1,950; the average 1954-59 value was \$14,000.

Since 1964 approximately one-half a man month of salmon management has annually been devoted to the Eastern District.

THE SALMON

King Salmon: Between 1930 and the early 1950's the king salmon was important to the Cook Inlet commercial fishery. The peak catch of kings occurred in 1951 when approximately 187,000 fish were caught. The decline in abundance of this species in Cook Inlet immediately followed the 1951 peak catch, and the decline continued without interruption until 1961 when the Board of Fish and Game curtailed fishing time. Escapement and catch studies in 1961, 1962, and 1963 indicated that stringent curtailment of the catch was mandatory in order to rehabilitate the sorely depleted runs. It was estimated in 1963 that king salmon stocks of Cook Inlet as a whole were reduced to approximately one-third of the level of the 1930's and 1940's. Effective in 1964 the Board of Fish and Game set the opening date of commercial salmon fishing in Cook Inlet so that an estimated 90 per cent of the king run would be protected -- they were on the spawning grounds by the time the season opened.

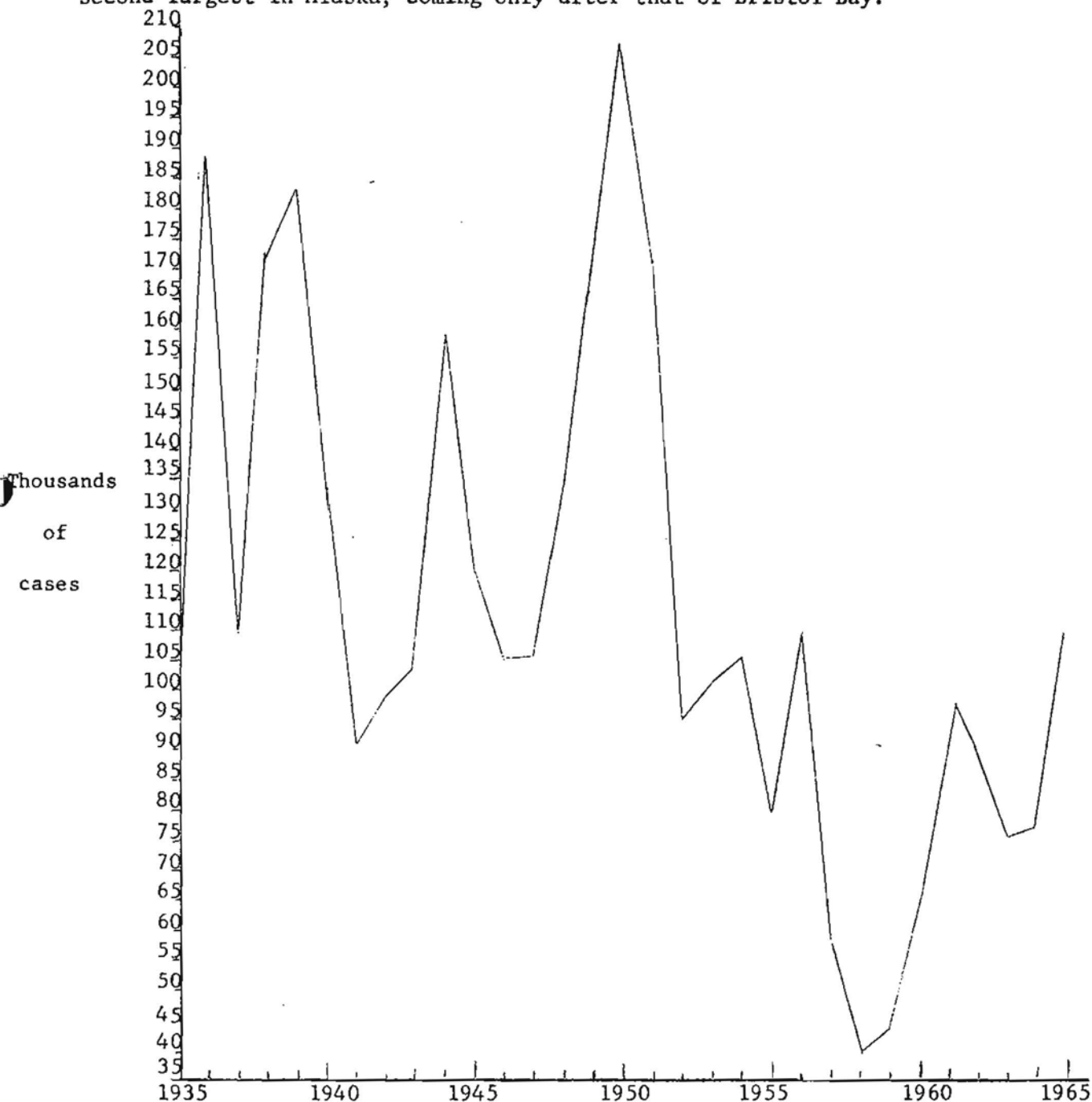
The early run of king salmon of the Inlet is bound largely for drainages above the Forelands -- the Susitna River primarily, but including Beluga River, Matanuska River, and other systems. King salmon caught after the opening date's for commercial fishing, June 25 and 24 (for the years 1964 and 1965) are bound mainly for the Kenai and Kasilof Rivers. The bulk of these fish are taken in the North Central and South Central Districts. These "July kings" or "leatherbellies" as they are commonly called, are generally not considered top quality by processors. Fewer than 300 kings are normally caught in the Northern District incidental to the catch of other species after June 25.



COOK INLET KING SALMON PACK IN CASES
1935-1965
(1 case = 48 one pound tall cans)

About 50 per cent of Cook Inlet king salmon are five year old fish and about 35 per cent are four year old fish. Re-building king salmon stocks in the Inlet can be expected to take some years.

Red Salmon: The red salmon is generally considered to be the most valuable species in Cook Inlet, and most management practices have been directed toward it. The first commercial fishing operation in Cook Inlet was in 1893 when a catch of 170,000 reds was made. In recent years the Inlet red catch has been second largest in Alaska, coming only after that of Bristol Bay.



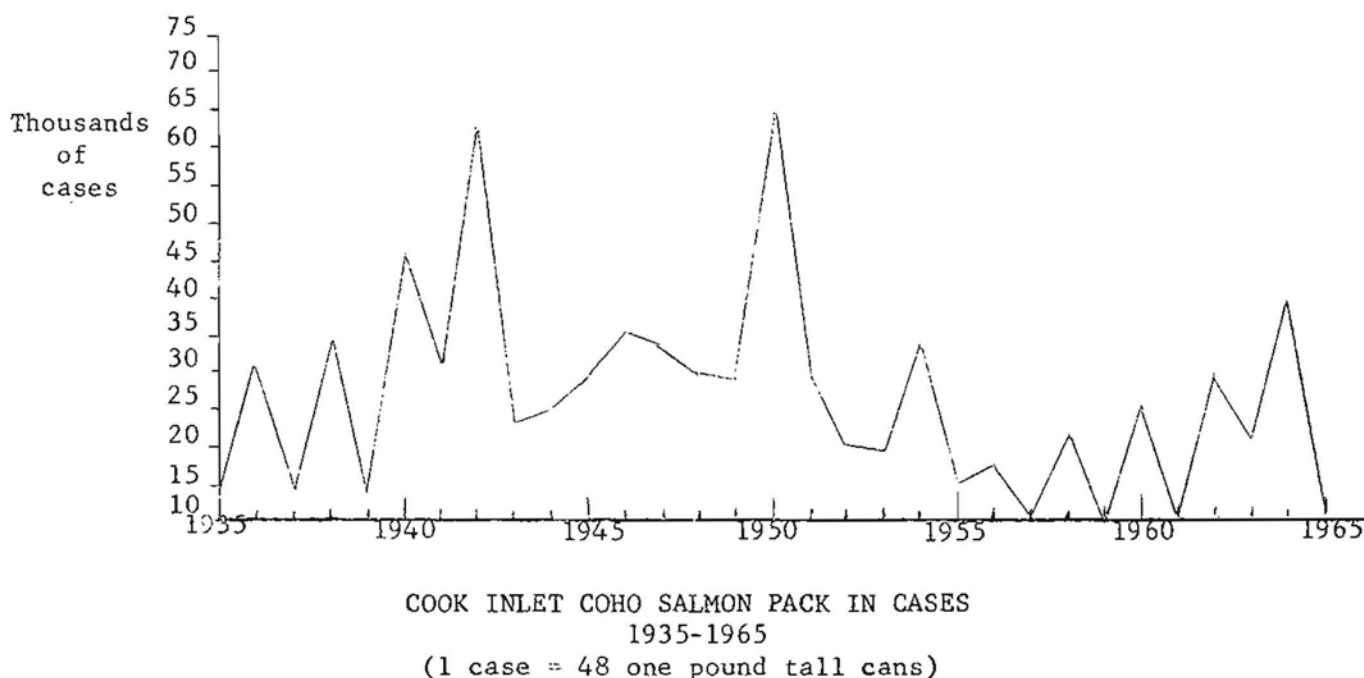
COOK INLET RED SALMON PACK IN CASES
1935-1965
(1 case = 48 one pound tall cans)

The trend of the Inlet red salmon pack has been upward since 1958.

The major red salmon producing drainages of Cook Inlet are the Kenai and Kasilof Rivers, in that order. A combination of the Susitna River, Beluga River and the Fish Creek (Knik Arm) also provides a run of red salmon that creates a commercial fishery for this species in the Northern District. In addition there are numerous smaller drainages from the latitude of Chisik Island north that support runs of red salmon: in combination these many small streams probably produce an appreciable proportion of the red salmon catch. One result of the multiple drainages producing red salmon in Cook Inlet is that many races of red salmon occur. Considerable size and body variation can be found in the usual red salmon catch of the Inlet.

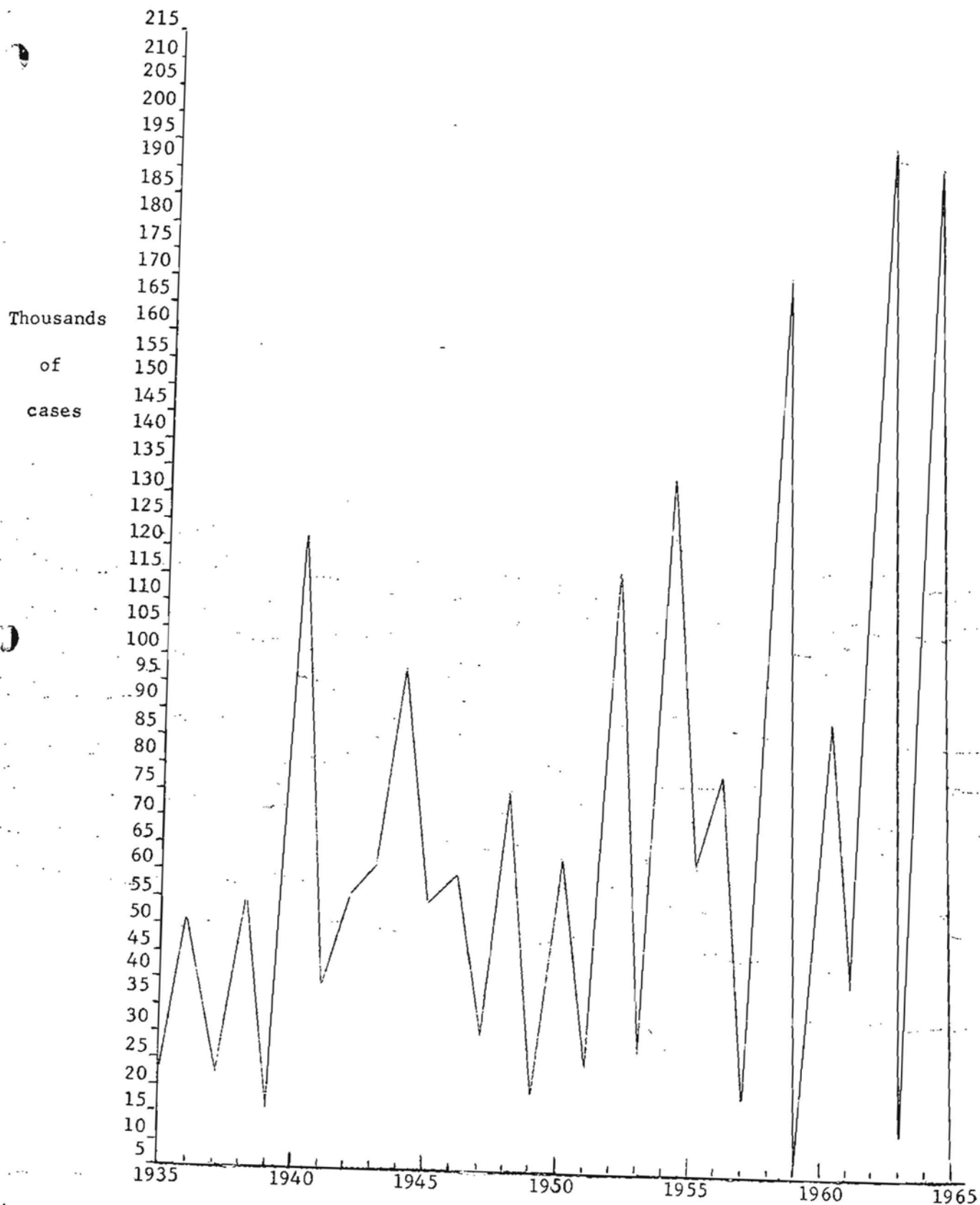
Normally about 60 per cent of Cook Inlet reds are five year old fish, from 15 to 20 per cent are four year old fish, and less than 20 per cent are 6 year olds.

Coho Salmon: The coho pack for Cook Inlet is characterized by an even-odd year fluctuation nearly as marked as that for pink salmon, with the strong runs occurring on even years. Since 1960 59 per cent of the Inlet cohos have been taken in the North Central and South Central Districts, and 39 per cent in the Northern District.



Cook Inlet cohos are normally four year fish. The peak pack of this species in recent years was in 1950 when 63,000 cases were packed. During the late 1930's the average coho pack was about 45,000 cases. After 1952 the pack gradually decreased to a low of about 9,000 cases in 1959. Since then the pack has gradually increased until 1964, when 39,300 cases were put up.

Cohos offer some opportunity for late fall and early winter fishing, particularly during even year runs, after the major canneries of the Inlet close. Cohos run far later than any other species in Cook Inlet, with fresh fish reported as late as December.



COOK INLET PINK SALMON PACK IN CASES.
1935-1965
(1 case = 48 one pound tall cans)

Pink Salmon: Pink salmon, which are abundant during even numbered years in Cook Inlet, were relatively unimportant in the Cook Inlet pack of the late 1930's with about a 40,000 case average during those years. In 1940 a peak of over 120,000 cases was established, but between that year and 1952 the pack ran somewhere between 60,000 and 80,000 cases, with highs and lows above and below these figures. Since 1952 the even year pink pack has increased steadily. In 1958 a pack of over 160,000 cases was put up, and in 1962 the record pack of 210,000 cases was made in Cook Inlet. The 1964 pink pack was 188,000 cases.

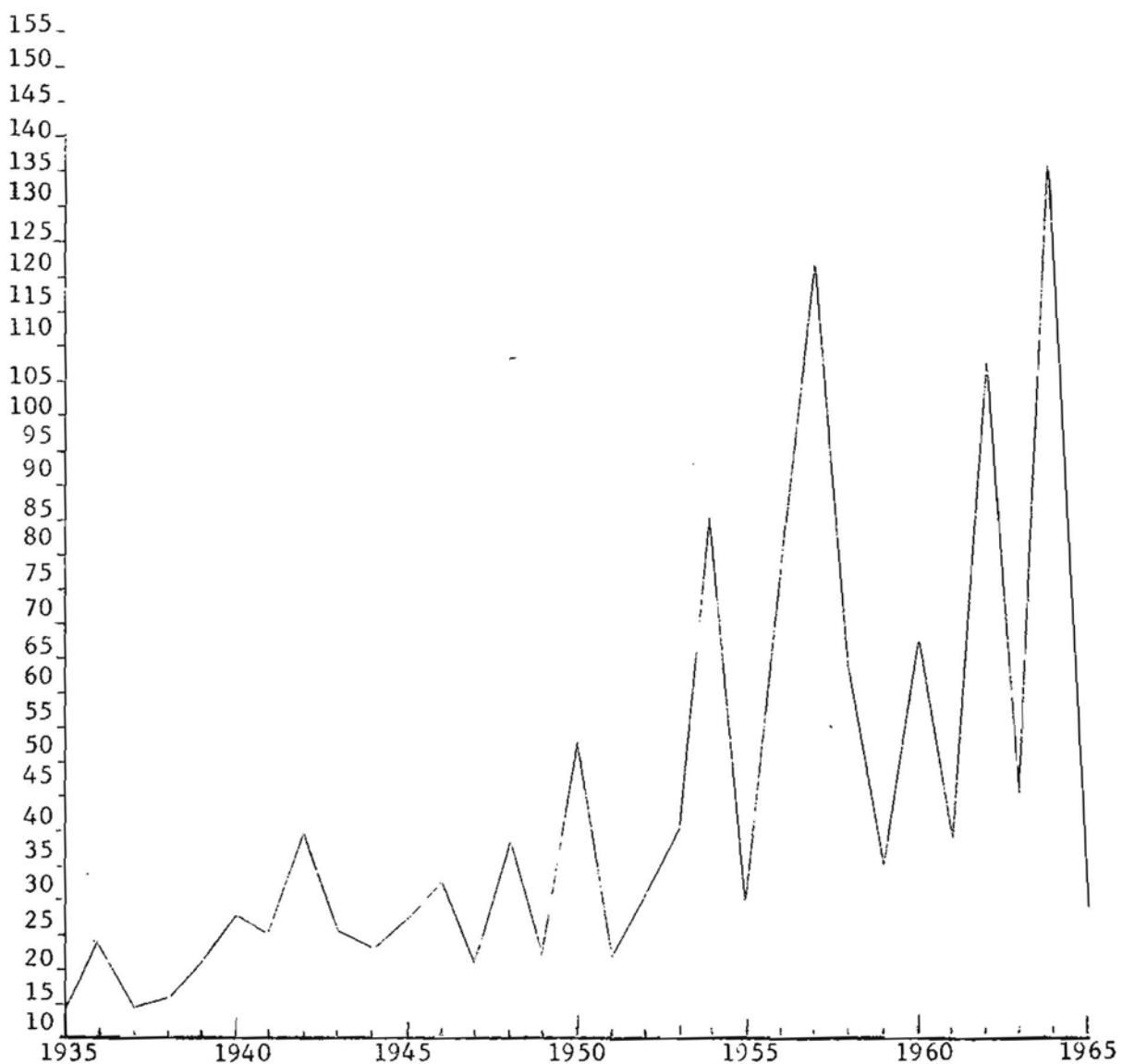
The tremendous numbers of pink salmon that arrive in upper Cook Inlet during even numbered years tend to mask catch figures for other species. For example, but a few thousand pinks can be expected to be caught in the Northern District during odd-numbered years, yet the great abundance during even years builds a catch that averages 42 per cent pinks over the six year period. The largest number of pinks are taken in the North Central and South Central Districts, followed by the catch of the Outer District, the Southern District, and then the Northern District. Pinks utilize both small and large drainage systems for spawning, and this species is found in practically every suitable spawning stream of the Inlet. The Talachulitna River, a clearwater, 35 mile long, tributary to the Susitna River, is probably the major producer of pink salmon above the Forelands. The Kenai River is another large river that supports huge numbers of spawning pink salmon.

The arrival of vast numbers of pink salmon about July 20 during even-numbered years has caused over-supply problems in Cook Inlet: if a strong run of reds, chums, and cohos appear at the same time, processing facilities may literally be overwhelmed.

Chum Salmon: The chum pack for Cook Inlet has increased markedly in recent years. The 1964 chum pack was the largest ever packed in the Inlet, with a total of nearly 136,000 cases. In the late 1930's the annual chum pack for the Inlet was approximately 20,000 cases. From 1940 to 1950 it averaged somewhat over 30,000 cases. From 1950 through 1964 it increased rapidly, with large packs in 1954, 1957, 1962, and the largest ever, in 1964.

No explanation is available for the drop in the chum catch for 1965: chum runs throughout the Gulf of Alaska, and indeed, the entire Pacific Coast, were weak during this year. It is also interesting to note that Cook Inlet chums during 1965 were smaller than normal.

The majority of chum salmon taken in Cook Inlet are 4 year fish.



COOK INLET CHUM SALMON PACK IN CASES
1935-1965
(1 case = 48 one pound tall cans)

TABLE 2

SALMON PER CASE, COOK INLET, BY CANNERY, 1960-1964

YEAR	KINGS	REDS	COHOS	PINKS	CHUMS
<u>Cannery #1</u>					
1960	3.5	13.0	13.5	23.0	12.0
1961	2.993	11.367	11.368	18.149	11.12
1962	3.25	11.9	13.6	24.5	10.7
1963	No record				
1964	--	12.457	13.322	22.037	9.254
<u>Cannery #2</u>					
1960-62	No record				
1963	--	13.2	10.3	22.0	11.1
1964	--	14.3	9.5	20.3	9.3
<u>Cannery #3</u>					
1960	No record				
1961	3.68	11.86	9.56	18.98	11.16
1962	4.77	13.33	10.57	20.98	9.71
1963	4.63	13.30	9.36	24.12	10.38
1964	3.85	14.0	9.65	20.3	8.85
<u>Cannery #4</u>					
1960	3.52	15.65	26.67	13.07	11.52
1961	3.515	12.39	12.083	24.876	10.576
1962	3.1	13.6	9.17	22.457	8.76
1963	3.63	13.04	10.43	28.75	10.37
1964	3.276	12.997	11.72	21.924	9.564
<u>Cannery #5</u>					
1960	--	13.42	11.03	25.16	11.38
1961	--	11.61	11.74	17.42	10.57
1962	4.69	12.4	12.73	26.82	10.42
1963	--	12.093	10.513	24.156	10.558
1964	--	12.37	12.53	22.62	9.27
<u>Cannery #6</u>					
1960-61	No record				
1962	--	12.08	11.50	24.21	9.61
1963	--	12.86	10.25	23.56	10.56
1964	--	12.25	11.37	21.02	9.55
<u>Cannery #7</u>					
1960-63	No record				
1964	9.0	16.2	9.1	21.4	--

For 1965 see page 14 following

ECONOMICS

Many of Cook Inlet's commercial salmon fishermen use salmon fishing as "vacation" employment. No figures are available to show how many of the salmon fishermen of the Inlet depend exclusively upon commercial fishing for their livelihood.

Cook Inlet, in common with many other salmon fishing areas in Alaska, has too many salmon fishermen; or, too much gear is being fished for salmon. Since 1952 salmon fishing during the major part of the run has been held to two 24-hour fishing periods a week. If more fishing time were allowed there would be a very real danger that all-important spawning escapement would not be achieved. There is so much gear in the gill net fishery that it is conceivable that during any 24-hour fishing period, unusual circumstances could combine to allow a catch that could be damaging to the future of the fishery -- and the evidence of this happening would not be available until after such catch was made.

Also, under this system, there are five days a week in which no extensive information on numbers of salmon present in the silty waters of the Inlet is available.

Because of the two day a week fishery, canneries must handle large quantities of fish at a time -- and oft-times they lay idle awaiting another glut of fish. This is inefficient use of equipment, and it does not produce the best possible quality food product. When unusual quantities of fish become available, the Inlet canneries may experience great difficulties in attempting to handle runs of this size, as happened in 1961 and 1964.

During years of weak pink and coho runs (odd-numbered years) canneries may not be able to buy sufficient salmon for a profitable operation.

Because there are so many fishermen to share in the Inlet's catch, the individual share is small, and many fishermen who have considerable investment in boats, gear, or fishing sites, find they cannot make a living at salmon fishing alone, as was once the case. (Table 6 shows the average annual income of Cook Inlet salmon fishermen by gear.) From 1959 through 1964 the annual average earning of a salmon gear license holder in Cook Inlet was \$3,313.

Because fishermen are not making enough money to live on, frequent protests are registered against closures or curtailment of fishing time. It is difficult to think of a distant future when you aren't sure you will be able to pay today's bills. Most of the pressures exerted by commercial fishermen on the commercial fisheries management staff of this area, and on the Department of Fish and Game, is a result of this situation.

The economy of the local area is not helped when money earned by fishermen is taken out of the state. Non-Alaskan fishermen are in the minority in Cook Inlet, but there are enough non-residents fishing and taking their earnings out of Alaska to cause concern: in 1962 non-resident fishermen caught 13 per cent of Cook Inlet's salmon, in 1963 they took 28 per cent, and in 1964 approximately 20 per cent. (See Table 4, Percentage of Salmon caught by Resident and Non-resident Fishermen.) Three years are too few to determine if a trend exists (catch by individual fisherman is not available prior to 1962: at this writing statistics on the 1965 catch have not been completed), but it is interesting to

note that 1962 and 1964 were similar years in size of catch and in amount of gear -- and that the non-resident catch increased in 1964 over that for 1962. The 1963 catch of 28 per cent by non-residents reflects the small seine catch for that year and the unusually high percentage of drift caught fish. The drift fishery, of course, includes in it the highest percentage of non-resident fishermen. (See Table 3, Gear Licence Sales, Cook Inlet.)

The economic ills of Cook Inlet's salmon fishery are not restricted to this area alone in Alaska, nor are these ills restricted to Alaska. No suggestions for solution are offered here.

Shift in Catch, by Gear: Prior to 1947 there was no important drift fishery in Cook Inlet. Once started drift gear increased rapidly, and 560, the maximum number ever, were recorded in 1951. The percentage of catch made by drift gear has fluctuated from year to year. Concurrent with the increase in drift gear, the percentage of salmon caught by traps decreased slightly. With the elimination of traps (last year fished in 1958), which averaged about 20 per cent of the catch 1954-58, the average percentage of salmon taken by set nets rose by 16, while the average percentage of drift gear catch increased by 4.

Since 1959, excluding 1965, for which exact figures are not available at this writing, set nets have taken an average of 45 per cent of the total Inlet catch, while drift gear has taken an average of 35 per cent of the catch. The seine catch during this period averaged 20 per cent. (See Table 1, Percentage of Cook Inlet Salmon Catch by Gear, 1945-64.)

TABLE 3

SALMON GEAR LICENSE SALES, COOK INLET, 1960-65

	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>SIX YEAR AVERAGE</u>
Set Gill Net: Resident	511	564	589	621	596	554	572)
Non-resident	<u>29</u>	<u>22</u>	<u>28</u>	<u>34</u>	<u>35</u>	<u>35</u>) 5% non-residents <u>30)</u>
Total	540	586	617	655	631	589	
Drift Gill Net: Resident	221	279	260	333	323	302	285)
Non-resident	<u>67</u>	<u>93</u>	<u>112</u>	<u>139</u>	<u>145</u>	<u>145</u>) 29% non-residents <u>116)</u>
Total	288	372	372	472	468	447	
Hand Purse Seine: Resident	86	85	84	102	102	65	87)
Non-resident	<u>9</u>	<u>4</u>	<u>7</u>	<u>10</u>	<u>6</u>	<u>6</u>) 7% non-residents <u>7)</u>
Total	95	89	91	112	108	71	

TABLE 4

PERCENTAGE OF SALMON CAUGHT BY RESIDENT AND NON-RESIDENT FISHERMEN

GEAR & YEAR	KING	RED	COHO	PINK	CHUM	TOTAL	ALL SPECIES, BY
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1962 - Percentage of total caught by resident fishermen - 87; by non-residents - 13.

SEINE:

Resident	100	99	99	94	94	94	30%
Non-resident		1	1	6	6	6	

DRIFT NET:

Resident	93	58	63	64	59	60	24%
Non-resident	7	42	37	36	41	40	

SET NET:

Resident	94	96	92	97	91	96	46%
Non-resident	6	4	8	3	9	4	

1963 - Percentage of total caught by resident fishermen - 72; by non-residents - 28.

SEINE:

Resident	95	97	97	91	87	90	19%
Non-resident	5	3	3	9	13	10	

DRIFT NET:

Resident	67	46	48	41	46	46	46%
Non-resident	33	54	52	59	54	54	

SET NET:

Resident	96	95	98	98	98	96	35%
Non-resident	4	5	2	2	2	4	

1964 - Percentage of total caught by resident fishermen - 80; by non-residents - 20.

SEINE:

Resident	100	100	100	95	91	93	19%
Non-resident				5	9	7	

DRIFT NET:

Resident	79	55	53	52	52	52	35%
Non-resident	21	45	47	48	48	48	

SET NET:

Resident	93	94	95	94	97	93	46%
Non-resident	7	6	5	6	3	7	

1965 - Percentage of total caught by resident fishermen - 67; by non-residents - 33.

	KING	RED	COHO	PINK	CHUM	TOTAL	ALL SPECIES BY GEAR
SEINE:							
Resident	100	100	100	100	100	100	7
DRIFT NET:							
Resident	88	53	52	66	57	54	71
Non-Resident	12	47	48	34	43	46	
SET NET:							
Resident	96	96	94	97	97	96	22
Non-Resident	4	4	6	3	3	4	

TABLE 5
NUMBERS OF INDEPENDENT AND CANNERY-OWNED DRIFT AND SEINE BOATS
1961-65

	<u>1961</u>	<u>%</u>	<u>1962</u>	<u>%</u>	<u>1963</u>	<u>%</u>	<u>1964</u>	<u>%</u>	<u>1965</u>	<u>%</u>
Cannery-owned	130	33	141	35	154	30	159	31	154	33
Indapendent	<u>262</u>	67	<u>258</u>	65	<u>346</u>	70	<u>347</u>	69	<u>317</u>	67
Total Boats	392		399		500		506		471	

TABLE 6

AVERAGE GROSS INCOME OF INDIVIDUAL COOK INLET FISHERMAN, BY GEAR
(BASED ON PRICES PAID FOR RAW FISH AS REPORTED BY CANNERIES)

<u>1959</u>	
69 Seine	\$1,407.41
370 Drift	995.50
534 Set Net	1,768.71

<u>1960</u>	
95 Seine	3,496.40
288 Drift	3,129.08
540 Set Net	3,586.22

<u>1961</u>	
89 Seine	2,178.39
372 Drift	3,364.81
586 Set Net	1,523.24

<u>1962</u>	
91 Seine	12,286.40
372 Drift	4,142.05
617 Set Net	4,042.39

<u>1963</u>	
112 Seine	1,782.77
472 Drift	2,158.79
655 Set Net	1,377.28

<u>1964</u>	
108 Seine	5,537.01
468 Drift	3,529.74
631 Set Net	3,328.86

6 year average income - \$3,313.06 (all gear)

MANAGEMENT OF THE COOK INLET SALMON FISHERY

Under federal management Cook Inlet salmon seasons were set in advance, with occasional variations from these seasons when unusual conditions called for a change. Flexibility was minimal -- it was necessary for a new regulation to be printed in the Federal Register before a change could occur in a salmon season. This frequently took days, and by the time it was accomplished, often the occasion that had called for the change was altered. This was according to the federal law that the managing agency had to operate under, and it was a severe handicap.

In 1960 the state was charged with the management of its commercial fisheries. An invaluable tool provided to the state fisheries management program has been the power to open and close fishing periods and areas as dictated by on the spot observations. These openings and closures are promulgated at the local level and they can be made effective in a matter of hours, thus affording maximum flexibility, and giving the opportunity for increased harvests when sufficient stocks are present and conversely, closures may be made rapidly when the situation demands. (See Table 7, Emergency Orders, Salmon, 1960-65.)

This procedure is handled in two ways in the Cook Inlet management area. In clear water areas, where escapement can be observed from low flying aircraft, seasons and openings have been based upon observed escapement. In the gill net fishery in the silty portion of the Inlet, where all major drainages are silty, direct enumeration of salmon escapement is impossible. During fishing season the catch made within this area during any given week is compared with catches for the same week of the year for previous seasons. A larger catch suggests a stronger run; a smaller catch suggests a weaker run. Weather, amount of gear, and of course, whether it is an even or an odd numbered year -- and the species of salmon involved must all be considered. During the normal several week build-up to a peak of this fishery a trend and a measure of strength of the run can generally be obtained by this "comparative" method of management. In essence, the entire fishery is acting as a test fishery, sampling the strength of the run.

Since catch by week figures are available for many years, and they are based upon a two day a week fishery, with known amounts of gear, a fairly solid basis exists for comparison.

At the same time that current catch figures are reviewed against previous year's figures, test fishing crews in the Kenai, Kasilof, and Susitna Rivers continually sample the runs of salmon entering these streams. Data provided by test fishing in this manner includes the species composition, and when the peak of abundance occurs for each species at the test fishing site. Total enumeration of salmon into these drainages cannot be obtained by test fishing.

Counting towers, where salmon are counted as they swim upstream, are located on two key streams: at Fish Creek on Knik Arm, and at Russian River, a major clear water tributary to the Kenai River. Counts of red salmon at these stations are figures that enter into any evaluation of the strength of Cook Inlet red salmon runs.

Management of the fisheries, using comparisons with past catches, plus data provided by test fishing and counting towers, obviously has many drawbacks. However it does have the advantage of providing information immediately, at the time the fishery is active, and at a time when liberalization or restriction of the fishery can be of benefit.

A knowledge of the relative numbers of fish present in the Inlet during two 24-hour periods a week, as determined by the catch, gives a fair indication of escapement that is occurring into the silty streams of the Inlet during the remaining five days of the week.

One unfortunate aspect of this system is that it is difficult to depart from it: any considerable alteration of fishing time during the build-up of a run invalidates comparisons with past years' catch data.

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TABLE 7

NUMBER OF EMERGENCY ORDERS, SALMON - 1960-1965

YEAR	NORTHERN, N. CENTRAL, S. CENTRAL	SOUTHERN	KAMISHAK	OUTER	EASTERN
1960	4	7	3	11	
1961	4	4	2	7	1
1962	6	5	3	4	2
1963	6	8	3	1	
1964	6	4	2	5	1
1965	6	4	2	4	1

EXPLANATION OF TABLES 8 THROUGH 14

Unless otherwise stated, figures represent individual fish. Statistical Digest No. 50, "Alaska Commercial Salmon Catch Statistics 1951-59", United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, 1960, is the source for the catch data 1954-59. Statistical Leaflets #1, #3, #5, and #7, of the Alaska Department of Fish and Game, "Alaska Commercial Fisheries Catch" for the years 1960, 1961, 1962, and 1963, are the sources for the 1960-63 catch figures. Philip E. Chitwood, Supervisor of Statistics provided the 1964 figures, which will appear in Statistical Leaflet #9 due for publication shortly. The 1965 figures were reported to the Homer field office of the Department of Fish and Game by canneries of the Cook Inlet area during the 1965 commercial salmon fishing season, and these figures are probably only approximations.

Changes in district boundaries have been considered, and data are representative of the districts as defined in 1965.

"Percentage of Inlet Catch" (Tables 8 through 14) represents the relative importance of the catch for each district, by year, to the total or combined catch of all seven Cook Inlet management area districts.

"Dollars Paid Fishermen" is based upon the average prices paid to independent fishermen by canneries as follows:

YEAR	KING	RED	COHO	PINK	CHUM
1954	4.00	1.17	.80	.30	.40
1955	4.00	1.25	.90	.33	.40
1956	4.50	1.35	1.00	.40	.50
1957	5.00	1.40	1.00	.40	.50
1958	5.00	1.40	1.00	.45	.55
1959	5.00	1.40	1.00	.40	.50
1960	5.00	1.45	1.00	.47	.60
1961	5.00	1.45	1.00	.47	.60
1962	5.00	1.47	1.00	.47	.60
1963	5.00	1.47	1.00	.44	.60
1964	5.00	1.47	1.00	.35	.60
1965	5.00	1.47	1.00	.35	.62

"Percentage of Catch by Species" indicates the relative importance of each species by number of individual fish, for each of the two six year periods indicated.

"Percentage of Change" represents the percentage of change between 1954-59 and 1960-65, using 1954-59 as base. For example, the 27 per cent increase for the overall catch indicates that the 1960-65 catch was 19,639,306 plus 27 per cent of that figure, or 24,986,605.

TABLE 8

TOTAL CATCH, INDIVIDUAL SALMON, ALL DISTRICTS

COOK INLET - RESURRECTION BAY MANAGEMENT AREA 1954-65

Year	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>Amt. Paid Fishermen</u>
1954	65,325	1,246,672	336,685	2,460,051	775,659	4,884,392	\$3,037,533
1955	46,499	1,064,128	180,452	1,286,008	317,053	2,894,140	2,247,811
1956	65,310	1,295,095	207,534	1,803,295	870,269	4,241,503	3,406,259
1957	42,767	670,629	127,199	306,841	1,207,920	2,355,356	2,006,611
1958	22,847	496,842	241,561	2,598,314	596,179	3,955,743	2,548,514
1959	32,783	634,313	112,664	137,255	411,157	1,328,172	1,425,097
Total	275,531	5,407,679	1,206,095	8,591,764	4,178,237	19,639,306	\$14,671,825
% Catch by Species	1.4%	28%	6%	44%	21%		
1960	27,539	948,040	314,153	2,023,252	776,079	4,089,063	\$3,243,081
1961	19,778	1,185,079	119,397	337,394	405,221	2,066,869	2,338,359
1962	20,270	1,172,859	358,051	4,960,030	1,149,841	7,661,051	5,204,620
1963	17,632	958,101	203,876	234,052	525,537	1,939,198	2,118,749
1964	4,622	990,709	462,114	4,287,378	1,402,419	7,147,242	4,283,599
	8,595	1,406,652	147,991	140,051	341,103	2,045,603	
1965	8,266	1,441,749	113,008	118,287	401,872	2,083,182	2,564,270
Total	98,107	6,695,537	1,571,599	11,960,393	4,660,969	24,986,605	\$19,753,680
% Catch by Species	.4%	27%	6%	48%	19%		
Difference	-177,424	+1,287,858	+365,504	+3,368,629	+482,732	+5,347,299	\$5,081,855
% Change	Decrease 64%	Increase 24%	Increase 30%	Increase 39%	Increase 12%	Increase 27%	

TABLE 9
NORTHERN DISTRICT

<u>Year</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>% of Inlet Catch</u>	<u>Amt. Paid Fisherme</u>
1954	22,585	120,508	139,464	347,040	84,571	714,168	14%	\$ 480,8
1955	20,522	52,927	46,365	3,226	40,321	163,361	6%	207,1
1956	18,457	114,612	80,322	398,851	169,545	781,787	18%	562,4
1957	21,422	90,431	44,416	1,678	101,454	259,401	11%	329,5
1958	9,308	69,222	100,813	408,043	92,227	679,613	17%	478,6
1959	13,222	134,930	41,230	2,348	50,699	242,429	18%	322,5
Total	105,516	582,630	452,610	1,161,186	538,817	2,840,759	Ave. 14%	\$2,381,0
% Catch by Species	4%	21%	16%	41%	19%			
1960	8,218	148,247	144,377	442,185	117,739	860,766	21%	678,8
1961	7,755	77,374	40,975	10,765	61,103	197,972	10%	233,6
1962	9,778	130,934	172,562	279,599	143,757	736,630	10%	631,5
1963	7,345	109,463	63,540	8,940	43,694	232,982	12%	291,3
1964	168 300	160,264 31,412	167,928 21,752	586,386 4,848	126,958 16,775	1,041,704 75,087	15% 3.6%	685,7
1965	266	19,374	18,518	4,460	23,921	66,539	3.2%	64,7
Total	33,530	645,656	607,900	1,332,335	517,172	3,136,593	Ave. 11%	\$2,585,9
% Catch by Species	1%	21%	19%	42%	16%			
Difference	-71,986	+63,026	+155,290	+171,149	-21,645	+ 295,834	3%	\$ 204,8
% Change	Decrease 68%	Increase 11%	Increase 34%	Increase 15%	Decrease 4%	Increase 10%		

TABLE 10

NORTH CENTRAL & SOUTH CENTRAL DISTRICTS COMBINED

Year	Kings	Reds	Cohos	Pinks	Chums	Total	% of Inlet Catch	Amt. Paid Fisherm
1954	41,195	1,086,538	182,061	1,842,267	425,497	3,577,558	72%	\$2,304,5
1955	25,404	974,601	124,412	98,454	208,022	1,430,893	49%	1,547,5
1956	46,518	1,144,177	117,867	1,196,524	612,506	3,117,592	72%	2,656,6
1957	20,831	553,281	81,018	19,550	900,016	1,574,696	66%	1,417,5
1958	13,419	408,170	138,952	1,240,505	379,470	2,180,516	55%	1,544,4
1959	19,426	471,966	61,619	10,506	239,134	802,651	60%	943,2
Ave.								
Total	166,793	4,638,733	705,929	4,407,806	2,764,645	12,683,906	62%	\$10,414,0
% Catch by Species	1%	37%	6%	35%	22%			
1960	19,294	785,292	167,125	981,465	542,258	2,495,434	61%	2,188,9
1961	11,982	1,084,929	76,803	23,252	288,525	1,485,491	72%	1,893,9
1962	10,432	1,016,639	177,762	2,432,090	864,177	4,501,100	59%	3,385,9
1963	10,191	833,517	133,600	21,496	343,333	1,342,137	69%	1,625,2
1964	4,363	809,791	285,713	2,645,575	952,128	4,697,570	66%	2,995,1
	8,295	1,357,604	125,496	14,683	288,550	1,794,628		
1965	7,994	1,409,975	92,375	4,500	343,148	1,857,992	89%	2,419,3
Ave.								
Total	64,256	5,940,143	933,378	6,108,378	3,333,569	16,379,724	69%	\$14,438,5
% Catch by Species	.4%	36%	7%	37%	20%			
Difference	-102,537	+1,301,410	+227,449	+1,700,572	+568,924	+3,695,818	Increase 7%	\$4,024,4
% Change	Decrease 61%	Increase 28%	Increase 32%	Increase 39%	Increase 21%	Increase 29%		

TABLE 11

SOUTHERN DISTRICT

<u>Year</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>% of Inlet Catch</u>	<u>Amt. Paid Fishermen</u>
1954	1,532	22,913	12,235	180,977	150,769	368,426	7%	\$ 157,324
1955	562	30,848	3,230	565,216	24,398	624,254	22%	239,995
1956	310	33,054	4,693	150,486	53,515	242,058	6%	137,662
1957	286	19,431	1,507	130,511	57,403	209,138	9%	111,046
1958	119	17,731	1,713	209,798	24,096	253,457	6%	134,793
1959	74	10,026	709	50,076	15,278	76,163	6%	42,784
Total	2,883	134,003	24,087	1,287,064	325,459	1,773,496	Ave. 9%	\$ 823,604
% Catch by Species	.01%	8%	1%	73%	18%			
1960	12	12,292	1,237	250,818	4,100	268,459	7%	139,464
1961	39	10,180	1,161	191,911	2,924	206,215	10%	108,069
1962	58	16,569	2,095	564,050	9,089	591,861	8%	297,298
1963	88	13,142	4,020	99,829	7,695	124,774	6%	72,320
1964	84 11	17,283 11,218	8,905 706	266,489 90,357	11,529 2,436	304,290 104,728	4%	134,919
1965	6	11,600	1,715	79,327	703	93,351	5%	46,997
Total	287	81,066	19,133	1,452,424	36,040	1,588,950	Ave. 7%	\$ 799,067
% Catch by Species	.02%	5%	1%	91%	2%			
Difference	-2,596	-52,937	-4,954	+165,360	-289,419	-184,546	Decrease 2%	\$ 24,537
% Change	Decrease 90%	Decrease 40%	Decrease 21%	Increase 13%	Decrease 89%	Decrease 10%		

TABLE 12

KAMISHAK BAY DISTRICT

<u>Year</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>% of Inlet Catch</u>	<u>Amt. Paid Fishermen</u>
1954	NO FISHERY							
1955		2	8	5,121	278	5,409	.18%	\$ 1,810
1956		67	701	193	14,936	15,898	.36%	8,341
1957		4,335	29	5,905	10,856	21,220	.90%	14,363
1958	NO FISHERY							
1959		1,549	43	5,325	25,759	32,676	2%	17,221
Total		5,953	781	16,544	51,829	75,203	Ave. .6%	\$ 41,735
% Catch by Species		8%	1%	22%	69%			
1960	11	768	28	11,563	44,328	56,698	1%	\$ 33,228
1961		1	14	6,019	12,465	18,499	.9%	10,323
1962		20	11	219	6,058	6,308	.08%	3,778
1963	1	4	97	82,314	13,892	96,308	5%	44,661
1964	5	1,979 4,453	115 26	20,719 1,081	42,280 3,486	65,098 10,246	.9%	35,668
1965		800	400			1,200	.06%	1,576
Total	17	3,572	665	120,834	119,023	244,111	Ave. 1%	\$ 129,234
% Catch by Species		1.5%	.2%	49%	49%			
Difference	17	- 2,381	- 116	+ 104,290	+ 67,194	+ 168,908	.4%	\$ 87,499
% Change		Decrease 40%	Decrease 15%	Increase 630%	Increase 130%	Increase 224%		

TABLE 13

OUTER DISTRICT

<u>Year</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>% of Inlet Catch</u>	<u>Amt. Paid Fishermen</u>
1954	13	4,927	369	82,205	112,877	200,291	4%	\$ 75,924
1955	7	701	277	557,997	40,887	599,869	20%	201,647
1956	23	2,889	190	42,368	19,248	64,718	2%	30,764
1957	13	2,982	110	149,197	138,171	290,473	12%	133,114
1958	1	1,719	83	739,768	100,386	841,957	21%	390,602
1959	3	10,365	109	68,875	65,675	145,027	11%	75,022
Total	60	23,583	1,138	1,640,410	477,244	2,142,435	Ave. 11%	\$ 907,073
% Catch by Species		1%	.05%	77%	22%			
1960	4	1,336	533	328,501	67,187	397,561	10%	\$ 197,197
1961	2	12,595	444	105,447	40,204	158,692	8%	92,399
1962	2	8,697	1,853	1,684,023	126,750	1,821,365	24%	882,228
1963	6	1,974	369	21,462	116,923	140,734	7%	82,897
1964	2	1,370	431	767,396	269,512	1,038,711	15%	432,750
		1,965	11	29,082	29,856	60,914		
1965				30,000	34,100	64,100	3%	31,642
Total	16	25,972	3,670	2,936,829	654,676	3,621,163	Ave. 11%	\$1,719,113
% Catch by Species		.7%		81%	18%			
Differ- ench		+2,389	+ 2,532	+1,296,419	+ 177,432	+1,478,728	None	\$ 812,040
% Change		Increase 10%	Increase 222%	Increase 79%	Increase 37%	Increase 69%		

TABLE 14

EASTERN DISTRICT

<u>Year</u>	<u>Kings</u>	<u>Reds</u>	<u>Cohos</u>	<u>Pinks</u>	<u>Chums</u>	<u>Total</u>	<u>% of Inlet Catch</u>	<u>Amt. Fishes</u>
1954		11,786	2,556	7,562	1,945	23,849	.4%	\$ 19
1955	4	5,049	6,160	55,994	3,147	70,354	2.4%	31
1956	1	296	3,761	14,873	519	19,450	.45%	10
1957	120	169	119		20	428	.01%	
1958				200		200	.05%	
1959	58	5,477	8,954	125	14,612	29,226	2%	24
Total	186	22,777	21,550	78,754	20,243	143,507	Ave. .9%	\$ 86
% Catch by Species	1%	16%	15%	55%	14%			
1960		105	853	8,720	467	10,145	.2%	\$ 5,
1961				NO FISHERY				
1962			3,728	49	10	3,787	.04%	3,
1963	1	1	2,250	11		2,263	.01%	2,
1964		22	22	813	12	869	.01%	
1965				NO FISHERY				
Total	1	128	6,853	9,593	489	17,064	Ave. .3%	\$ 11,
%Catch by Species		.7%	40%	56%	3%			
Differ- ence	-185	-22,649	-14,697	-69,161	-19,754	-126,443	.6%	\$ 74,
% Change	Decrease 100%	Decrease 99%	Decrease 68%	Decrease 88%	Decrease 98%	Decrease 88%		

THE FUTURE

Little basic salmon research has been done in Cook Inlet. A research program, financed largely with federal aid funds has been approved. The goal is, "To provide the basic biological data on the Cook Inlet sockeye salmon stocks, including optimum escapement levels and prediction of the runs in order to provide proper management of the resource."

Research will be continued on a sonar fish counting device so that numbers of salmon escaping into spawning areas can be determined. Work on this equipment started in Cook Inlet in 1961, and by the summer of 1965 an advanced experimental model was in use in Cook Inlet. When fully developed, the sonar salmon counter will be useful throughout Alaska.

Also under the new federal aid program, a comprehensive sampling plan will be developed to provide annual records of characteristics of salmon caught in various gill net fishing areas of the Inlet. Spawning ground sampling for the same characteristics will be conducted at selected points in each of the three major spawning systems, with the hope that it will be possible to determine which stocks of fish various segments of the fishery are harvesting, so that the fishery can be managed to allow maximum harvest and optimum escapement to individual drainages.

Estimates will be made of outmigrations of smolts as they leave fresh water for the sea. These data should provide a basis for evaluation of escapement levels, and eventually they may provide a basis for forecasting the size of returning runs of salmon.

Forecasts of strength of returning pink salmon runs is the eventual goal of another federal-aid research project, commenced in Cook Inlet in 1962 with state funds, and now continuing in expanded form with federal assistance. The work started in lower Cook Inlet will be expanded, as funds permit, to the upper Inlet.

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1965 AERIAL SURVEYS ON SET AND DRIFT NET FISHERY, SOUTH CENTRAL AND NORTH CENTRAL DISTRICTS

SET NETS	JUNE 24	JUNE 28	JULY 1	JULY 12	JULY 19	JULY 22	JULY 28
Ninilchik-Kasilof	129	238				295	250
Kalifonski	79	77		105		107	77
Kenai-Boulder Pt.	84	84		79		145	99
Kalgin Island	85	95		120	104*	97*	74*
Harriet Pt.-Snug Harbor	12	24				20	
Snug Harbor	19	49				31	
Snug Harbor-Chinitna	16						
Chinitna	10						
DRIFT NETS	14	21	110		336	306	214

*West Side of Island only.

INTENT TO OPERATE - 1965

CANNERY	LOCATION	SUPERINTENDENT	NUMBER OF LINES	PRODUCT
Alaska Fish, Inc. Box 458, Kenai	Iliamna	James B. Brewer		Salmon: Fresh, frozen, mild-cured, smoked. Pike, Char, Whitefish: Fresh, frozen, smoked.
Alaska Fish & Farm Products, Inc. Box 74, Anchorage	Anchorage	K. C. Britt		Salmon: Fresh, frozen. Halibut: Fresh, frozen.
Alaskan Smokey Joes, Inc. Box 1381, SRA, Anchorage	Mile #7 Seward Hwy.	William E. McBride	1 - 1# Talls 1 - 1# Flats	Salmon: Canned, fresh, frozen, smoked.
Alaska Star, Inc. 1206 W. 29th Place Anchorage	Beluga River	Walter B. Swanson	Hand pack	Salmon: Hard smoked canned.
Alaskan Sea Foods, Inc. Box 152, Homer	Homer Spit	Eugene V. Browning		Dungeness: Fresh, frozen. King crab: Fresh, frozen. Halibut: Fresh, frozen.
Alcan Fisheries N. Star Rt., Kenai	Kenai	C. E. Gage		Salmon: Fresh, frozen. Halibut: Fresh, frozen.
B and K Fisheries Box 486, Soldotna	Silver Salmon Creek, W. side Cook Inlet	Wayne E. Bell		Salmon: Hard salt.
Berman Packing Co. Box 207, Ninilchik	Ninilchik	O. R. Bertosen	1 - 1# Talls 1 - 1/2# Flats	Salmon: Canned, frozen.
Columbia-Wards Fisheries Rt. #2, Kenai	Kenai	A. R. Pearmain	2 - 1# Talls 1 - 1/2# Flats 1 - 1/2# Flats	Salmon: Canned.
Dan's Cold Storage Box 204, Ninilchik	Ninilchik	Dan Garrouette		Frozen: Salmon, halibut, clams.

Ekren Packing Co. Kasitsna Bay	Kasitsna Bay	John A. Ekren		Canned: Clams, king crab, Dungeness, salmon.
Emard Packing Co. Inc. Box 599, Anchorage	Anchorage	Glenn Bergen	1 - 1# Talls 1 - 1/2# Flats	Salmon: Canned
Deep Creek Sport Shop Box 173, Ninilchik	Ninilchik	James A. Garrouette		Salmon: Smoked
Glacier Bay Fish Co. Box 566, Sitka	Anchorage	M. R. Koroch		Salmon: Fresh, frozen, mild cured. Halibut: Fresh, frozen. Glacier Bay will be operating a sharp freezer and cold room facilit at the Western Supply Co. plant in Anchorage.
Glacier Queen, Inc. Box 1208, Seattle	Cook Inlet	A. Rosnes	Floater M/V DELPEN	Salmon: Fresh, frozen.
Halibut Producers Coop. Box 796, Seward	San Juan Dock Seward	Terrell Schenk		Salmon: Fresh, frozen, mild-cured. Halibut: Fresh, frozen.
Homer Brand Seafoods, Inc. Box 313, Homer	Homer	Henry J. Hunter		Salmon: Frozen, mild-cured, smoked Shrimp: Fresh, frozen, instant. Dungeness: Fresh, frozen. King crab: Fresh, frozen. Halibut: Fresh, frozen. Clams; Fresh, frozen.
Henry Horton Mile 3 1/2, Seward	Seward	Henry Horton	1 - 1# Talls 1 - 1/2# Flats	Salmon: Fresh, frozen, hard salt, smoked & kippered, canned. Shrimp: Frozen, canned. Dungeness: Fresh, frozen, canned. King crab: Fresh, frozen, canned. Halibut: Fresh, frozen, canned. Clams: Frozen, canned.
Kenai Packers 1455 N. Northlake Pl. Seattle, Washington	Kenai	H. A. Daubenspeck	1 - 1# Talls 1 - 1/2# Flats	Salmon: Canned.

Kenai Peninsula Fisheries, Inc. Box A, Cohoe	Kasilof River	Raymond E. Burton		"In 1965 we will operate only a receiving station. The bulk of the fish will be purchased by Halibut Producers."
Lafrenere, Ray Box 3, Clam Gulch	Mile 124½, Sterling Hwy.	Ray LaFrenere	1 - ½# Flats	Salmon: Smoked.
Lyon, Kenneth R. Box 132, Homer	Kachemak Bay	Kenneth R. Lyon		Shrimp: Fresh, frozen.
Osmar's Ocean Specialties Clam Gulch	Clam Gulch	Per E. Osmar	1 - 1½# Tails	Salmon: Canned, frozen.
Pacific Alaskan Seafoods Homer,	Homer Spit	Lee K. Shelford		Salmon: Fresh, frozen, smoked. Shrimp: Fresh, frozen, cold pack. Dungeness: Fresh, frozen, cold pack King crab: Fresh, frozen, cold pack. Halibut: Fresh, frozen. Herring: Bait.
R. M. Prather Box 411, Soldotna	Homer	R. M. Prather		Salmon: Fresh, frozen. Dungeness: Fresh, frozen. King crab: Fresh, frozen. Halibut: Fresh, frozen.
Proulx, Bob Box 809, Homer	Homer	Bob Proulx		Halibut: Fresh. Herring: Bait.
Puget Sound Salmon Egg Co., Inc. 1440 S. Jackson, Seattle	Snug Harbor	Steve Sarjach, Jr.		Egg Processing: Salmon eggs. Herring roe.
R-Lee Company Rt. #2, Soldotna	Kalifonsky Beach	R. L. Schmidt		Salmon: Frozen, hard salt, smoked.
Seldovia-Port Graham Consolidation Seldovia	Seldovia	J. J. Lind	1 - 1½# Tails 1 - ½# Flats	Salmon: Canned.

CANNERY	LOCATION	SUPERINTENDENT	NUMBER OF LINES	
Charles L. Simon Box 27, Kasilof	Kasilof	Charles L. Simon, Sr.	Hand pack.	Salmon: Canned. Halibut: Canned & smoked.
Snug Harbor Packing Co. 204 Administration Bldg. Fishermen's Terminal Seattle, Washington	Snug Harbor	J. R. Fribrock	1 - 1# Tails 1 - 1# Flats 1 - $\frac{1}{2}$ # Flats	Salmon: Canned.
Tee Pee Cold Storage Star Route, Kenai	Kenai	Bill Roark		Salmon: Fresh, frozen. Halibut: Fresh, frozen.
Tidewater Packing Co. Box 1842, Anchorage	Ocean Dock Road Anchorage	P. Ray Coffin, Jr.	1 - $\frac{1}{2}$ # Flats	Salmon: Canned.
Jensen, Torvald Box 123, Ninilchik	Ninilchik	Torvald Jensen		Salmon: Smoked.
Wakefield Fisheries Seldovia	Seldovia	Charles S. Hendrix		King Crab: Frozen.
Waterfall Fisheries, Inc. Clam Gulch	Clam Gulch	Emil R. Bartolowits	1 - $\frac{1}{2}$ # Flats	Salmon: Canned, fresh, frozen, smoked. Halibut: Fresh, frozen.
Wells, Joseph H. Mattson's Market, Seward	Seward	Richard K. Mattson		Salmon: Fresh. Halibut: Fresh, frozen. King crab: Frozen.

TOTAL CUMULATIVE PACK, COOK INLET - 1965

WEEK ENDING	KINGS	REDS	COHOS	PINKS	CHUMS	TOTAL
June 13	0	29	0	.5	2	31.5
June 20	0	78.5	0	2	4.5	85
June 27	124.5	631	0	58.5	58.5	872.5
July 4	437	3,843	2.5	581	173.5	5,037
July 11	450.5	17,656	218	1,547	1,996	21,867.5
July 18	747	53,563	2,272	3,465	11,020	71,067
July 25	974	95,032	6,311	5,194	22,250	129,761
August 1	1,012	106,488	7,803	5,592	24,725	145,620
August 8	1,095	107,540	9,812	5,768	26,462	150,677
August 15	1,185	107,896	10,504	5,863	28,066	153,514
August 22	1,185	107,899	10,605	5,863	28,072	153,624
August 29	1,185	107,899	10,645	5,863	28,075	153,667
September 12	1,185	107,899	10,700	5,863	28,077	153,724
Corrected Totals Taken from Cannery Annual Reports	1,236	109,207	12,040.5	5,908.5	27,210	155,602

COOK INLET SALMON PACK BY CANNERY - 1965

CANNERY	KINGS	REDS	COHOS	PINKS	CHUMS	TOTAL
Alaskan Smokey Joe	22	0	40	0	33	95*
Alaska Star Inc.	0	12	5.5	0	3	20.5
Berman Packing	0	5,017.5	436.5	44.5	512.5	6,011
Columbia-Wards	281	23,837	1,673	97.5	4,304.5	30,193
Ekren Packing	0	20.5	0	14	0	34.5
Emard Packing	26	2,440	1,784	202.5	1,506.5	5,959
Horton's Seafoods	0	33	6.5	0	0	39.5
Kenai Packers	682	41,942	3,888.5	283	8,312.5	55,108
Osmar's Ocean Spec.	0	826	1,161	27	12	2,026
Seldovia-Pt. Graham	7	21,106.5	1,263	4,648.5	8,207	35,232**
Snug Harbor	126	13,335	1,561.5	532	4,204	19,758.5
Tidewater Packing	70	252	148	45.5	69	584.5
Waterfall Fisheries	22	385.5	73	14	46	540.5
Totals	1,236	109,207	12,040.5	5,908.5	27,210	155,602

*Packed in Cook Inlet, but caught in AYK

**Custom packed at Emard Packing Co. & Snug Harbor Packing Co.

PRICES PAID AND FISH PER CASE, COOK INLET, BY CANNERY, 1965 (Price in Parenthesis)

CANNERY	KINGS	REDS	COHOS	PINKS	CHUMS
Emard Packing Co.	3.0 (5.00 L) (2.50 M)	11.97 (1.47)	13.78 (1.00)	22.11 (.35)	13.25 (.60)
Columbia-Ward Fisheries	4.05 (5.00)	12.09 (1.47)	9.46 (1.00)	22.12 (.35)	10.56 (.60)
Berman Packing Co.	Frozen (5.00)	11.22 (1.47)	11.5 (1.00)	20.4 (.35)	23.3 (.70)
Kenai Packers	3.164 (5.00 L) (2.50 M) (1.00 S)	12.856 (1.47)	11.935 (1.00)	31.375 (.35)	10.274 (.60)
Tidewater Packing	2.1 (.34 per #)	6.4 (1.53)	5.8 (1.10)	11.6 (.35)	5.1 (.60)
Snug Harbor Packing	3.068 (5.00 L) (2.50 M)	11.64 (1.47)	11.904 (1.00)	21.96 (.35)	11.625 (.62)
Osmar's Ocean Spec.	Frozen (5.00 L) (2.50 M) (1.00 S)	11.5 (1.57)	9.5 (1.10)	18.5 (.35)	15. (.75)
Seldovia-Port Graham Con.	3.225 (5.00)	11.67 (1.47)	12.37 (1.00)	22.381 (.35)	11.585 (.62)
Average	3.10 (5.00)	11.17 (1.49)	10.78 (1.025)	21.31 (.35)	12.59 (.63625)

SALMON CATCH BY STATISTICAL AREA AND GEAR - 1965

AREA	GEAR	KINGS	REDS	COHOS	PINKS	CHUMS	TOTAL
232	Hand Purse Seine		1,964		26		1,990
241	Hand Purse Seine	1	231	419	83,063	1,780	85,494
241	Set Gill Net	9	10,998	314	7,267	679	19,267
242	Hand Purse Seine		1	7	21,790	22,443	44,240
243	Hand Purse Seine		808	4	3,452	2,706	6,970
243	Set Gill Net			118		469	587
244	Drift Gill Net	893	864,246	58,587	3,408	206,686	1,133,820
244	Set Gill Net	7,835	174,748	35,254	11,748	1,856	231,441
245	Hand Purse Seine	1	3,013	599	83	7,843	11,539
245	Drift Gill Net	84	240,526	10,877	963	63,245	315,695
245	Set Gill Net	424	61,049	16,861	1,383	17,103	96,820
246	Drift Gill Net		11,713	596	10	1,937	14,256
246	Set Gill Net	204	25,480	8,943	1,454	868	36,949
247	Set Gill Net	300	31,575	21,902	4,914	16,906	75,597
Totals		9,751	1,426,352	154,481	139,561	344,521	2,074,666

KING SALMON BEACH SURVEY REPORT

One man was assigned to contact all set net fishermen from Ninilchik to the Kenai River during the 1965 salmon season in order to determine the number of king salmon caught by these fishermen. Forms were left with fishermen and individual contacts were made at least weekly to pick up the filled in forms and to talk with the fishermen.

During the season 5,794 king salmon were reported taken by all set net fishermen from Ninilchik to the Kenai River. Of these, 210 weighed under five pounds, 722 weighed between five and fifteen pounds, and 4,862 weighed over fifteen pounds.

The total catch of individual king salmon from all districts of Cook Inlet during 1965 amounted to 8,266.

HUMPY CREEK RESEARCH PROJECT

The Humpy Creek project was continued in 1965 in order to enumerate the pink salmon escapement into the stream, study the observability of different type salmon tags on the spawning riffles, and conduct a mortality study. Along with these prime objectives, routine sampling of the stream temperature, weather conditions, daily escapement, sex ratios, and intertidal spawning populations below the weir were observed and recorded.

The weir was installed on June 4, 1965, and removed on August 23, 1965. The escapement commenced on July 12 and was essentially over on August 18. During this time period 13,008 females and 10,115 males passed through the weir gate. Fish spawning below the weir in the intertidal zone amounted to 5,000, making the total escapement into the creek 28,123 pink salmon. The peak of the run occurred August 11, when 6,465 fish passed through the weir. Eleven chum salmon passed upstream.

The tag comparison study was carried out by affixing different type tags in various body locations and then observing the fish on the spawning riffles. Peterson disc, spaghetti material, and red flagging material was used for tagging purposes. The final analysis of the data is not complete, but visual observation of the results indicates definite differences between the various type tags. The least observable is the spaghetti material while the red flagging appears to be the most easily seen.

During the pre-emergent fry sampling in previous years, it has been observed that one portion of Humpy Creek did not produce pink fry as well as other areas. It was also observed that many worms of the turbularian variety were present in the gravel. Sixty redds where fish were actually observed spawning were staked out. Forty of the redds were located in the non-productive area while 20 redds were staked out in the productive region. One-half of the redds were dug up in the fall immediately following spawning,

(20 non-productive, 10 productive), and the other 30 were scheduled for sampling in the spring. The fall sampling indicated eyed eggs were present in both the productive and non-productive areas. Sampling in the spring during the pre-emergent fry survey indicated that live fry were present in the non-productive area along with the turbularian worms.

COOK INLET AREA PINK SALMON FORECAST STUDIES

The following 13 page report is the result of the Cook Inlet pre-emergent fry studies and subsequent forecast for the Southern and Outer Districts. This report was printed as an Informational Leaflet and distributed to interested parties.

Informational Leaflet 74

COOK INLET AREA PINK SALMON FORECAST STUDIES 1964-1966

By:

Allen S. Davis
Division of Commercial Fisheries
Research Section
Homer, Alaska

March 28, 1966

STATE OF ALASKA
WILLIAM A. EGAN - GOVERNOR

DEPARTMENT OF
FISH AND GAME
WALTER KIRKNESS - COMMISSIONER
SUBPORT BUILDING, JUNEAU



COOK INLET AREA PINK SALMON FORECAST STUDIES, 1964-1966

by

Allen S. Davis, Fishery Biologist
Alaska Department of Fish and Game
Division of Commercial Fisheries
Research Section
Homer, Alaska

INTRODUCTION

The Cook Inlet Area commercial salmon fishing harvest consists of all five species of the Pacific salmon. Since 1960 pink salmon have comprised 48 percent of the total catch of fish, with sockeye salmon 27 percent, chum salmon 19 percent, coho salmon 6 percent, and king salmon .4 percent. The dominant cycle of pink salmon in Cook Inlet occurs during even-numbered years. Catches since 1960 have ranged from a high in 1962 of 4.9 million fish to a low in 1965 of .12 million.

The Cook Inlet Area is comprised of seven regulatory fishing districts (Figure 1).

The Northern district pink salmon fishery is comprised entirely of set gill net gear. Figure 2 shows the catch of pink salmon in the Northern district. The largest catch of pink salmon since 1951 was the 1964 catch of 586,000 fish. The lowest catch occurred during 1957 when less than 2,000 pinks were harvested. The Susitna River drainage is the largest producer of pink salmon in the district. During the large even-year runs, fish utilize most streams along both sides of Cook Inlet, Turnagain and Knik Arms. Pre-emergent fry sampling was conducted in the Talachulitna River of the Susitna River drainage and the data is presented in the results section.

Commercial salmon fishing in the North and South Central districts is conducted by set gill nets along the beaches, drift gill nets in the offshore waters, and purse seines in Chinitna Bay only. Catches of pink salmon since 1951 have fluctuated between a high of 2.6 million in 1964 to a low of 10,500 in 1959 (Figure 2). The Kenai and Kasliof Rivers are the most important pink salmon producing streams in the districts. Both of these streams are glacial in nature. Pre-emergent fry sampling has not been conducted in these districts.

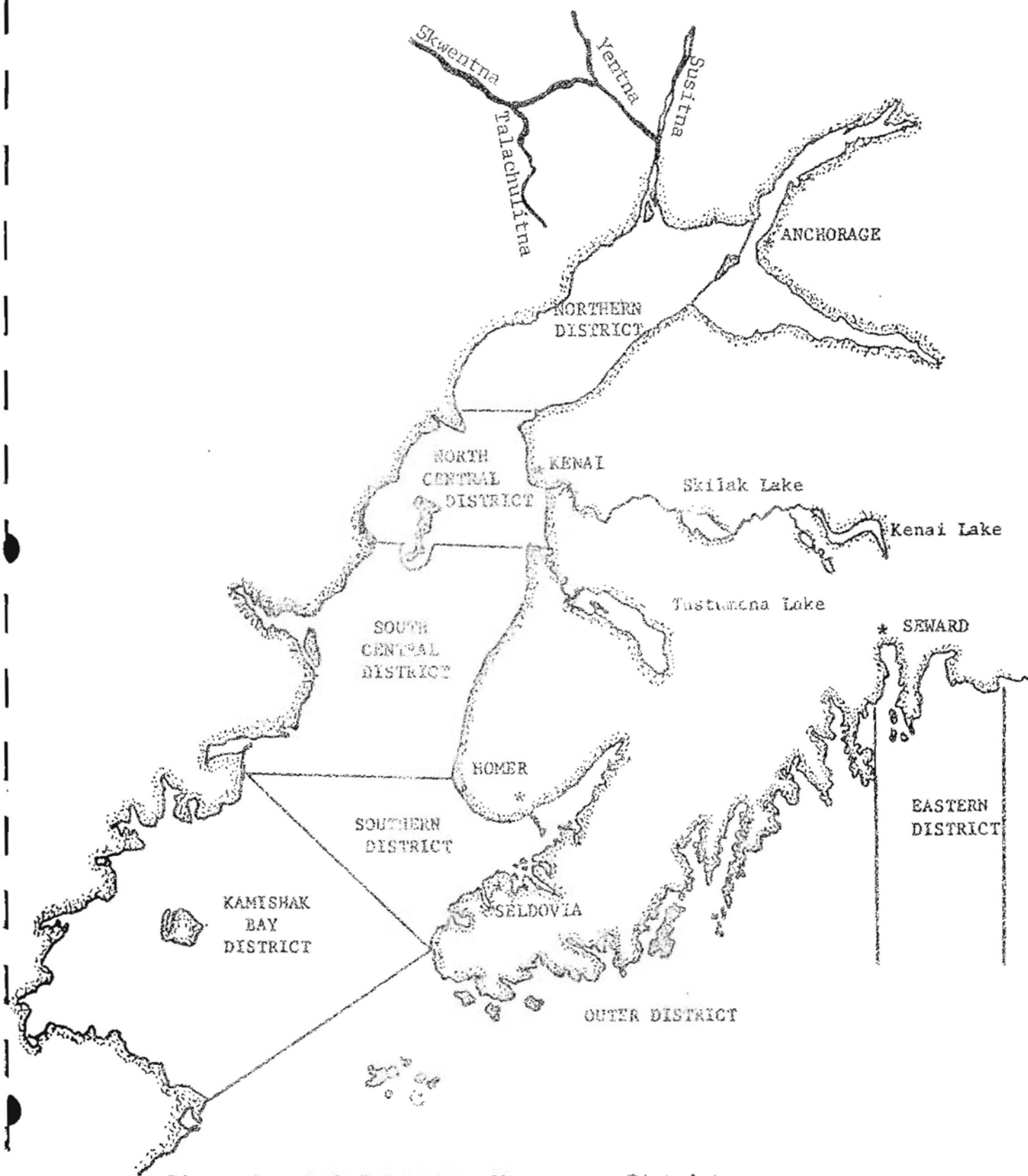


Figure 1. Cook Inlet Area Management Districts.

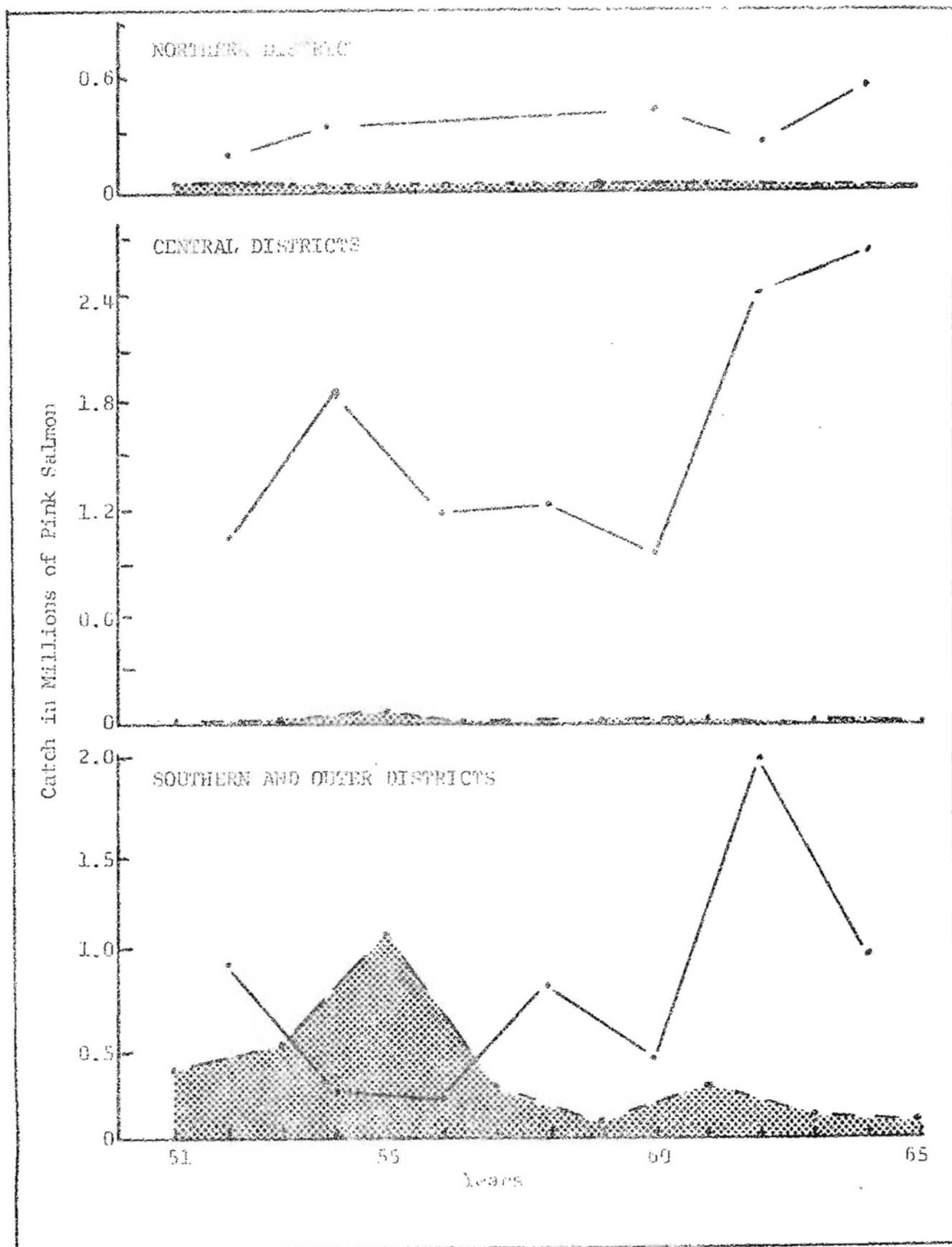


Figure 2. Odd and even year commercial catches of pink salmon in three districts of Cook Inlet, 1951-1965. Even-year catch solid line; odd-year catches broken line (shaded).

Purse seines are the only type gear utilized in the Kamishak Bay district for commercial salmon harvest. Lack of safe anchorages and no close market facilities make seining in the area unattractive. Catches of pink salmon have fluctuated from zero in years of no fishing effort to a high of 82,000 fish in 1963. Pink salmon spawn in the majority of the streams in the district. The most important pink salmon stream in the area is Bruin Bay River. No pre-emergent fry sampling has been conducted in the Kamishak Bay district.

In the Southern and Outer districts, the majority of the pink salmon are taken by purse seines; however, portions of the Southern district are open to set gill nets. Figure 2 compares the odd- and even-year commercial catches of pink salmon in the Southern and Outer districts. Since 1958, the even-year cycle has been the dominant year class; however, the fluctuation between odd- and even-year catches is not as variable in these districts as in the Northern and Central districts. Since 1951, the largest pink salmon harvest was in 1962, when 2.3 million fish were caught. The lowest catch occurred in 1959, when 119,000 fish were taken. Unlike the major pink salmon spawning streams in Cook Inlet north of Anchor Point, spawning riffles in these districts are located in the intertidal and lower freshwater portions of the streams. In 1963 ten streams in the area from Kachemak Bay to Port Dick were selected for pink salmon studies. Figure 3 shows the location of the study streams. Pre-emergent fry sampling has been conducted on six to ten of the study streams since 1963. The data and conclusions from the sampling are presented in the results section.

The Eastern district has produced small catches of pink salmon in the years since 1956. Less than 1,000 fish have been taken annually, except 1960 when 9,000 pinks were harvested. No pre-emergent fry sampling has been conducted in this district.

METHODS

Pre-emergent fry sampling methods were thoroughly described in Alaska Department of Fish and Game Informational Leaflet No. 36 (Noerenberg, 1964). No changes in procedures in the Cook Inlet area were made in 1965. The number of sample points and area of sampling has gradually been adjusted to provide better coverage of the utilized spawning area.

Gravel shift and freezing level indicators were described in Alaska Department of Fish and Game Informational Leaflet No. 65 (Davis, 1965). Three of the ten study streams were checked for gravel shift and freezing level during the winter of 1964-65. The conclusions of the study are presented in the results section.

The periodic surveys of 1964 escapements in the ten study streams of the Southern and Outer districts are presented in Table 1. With the exception of

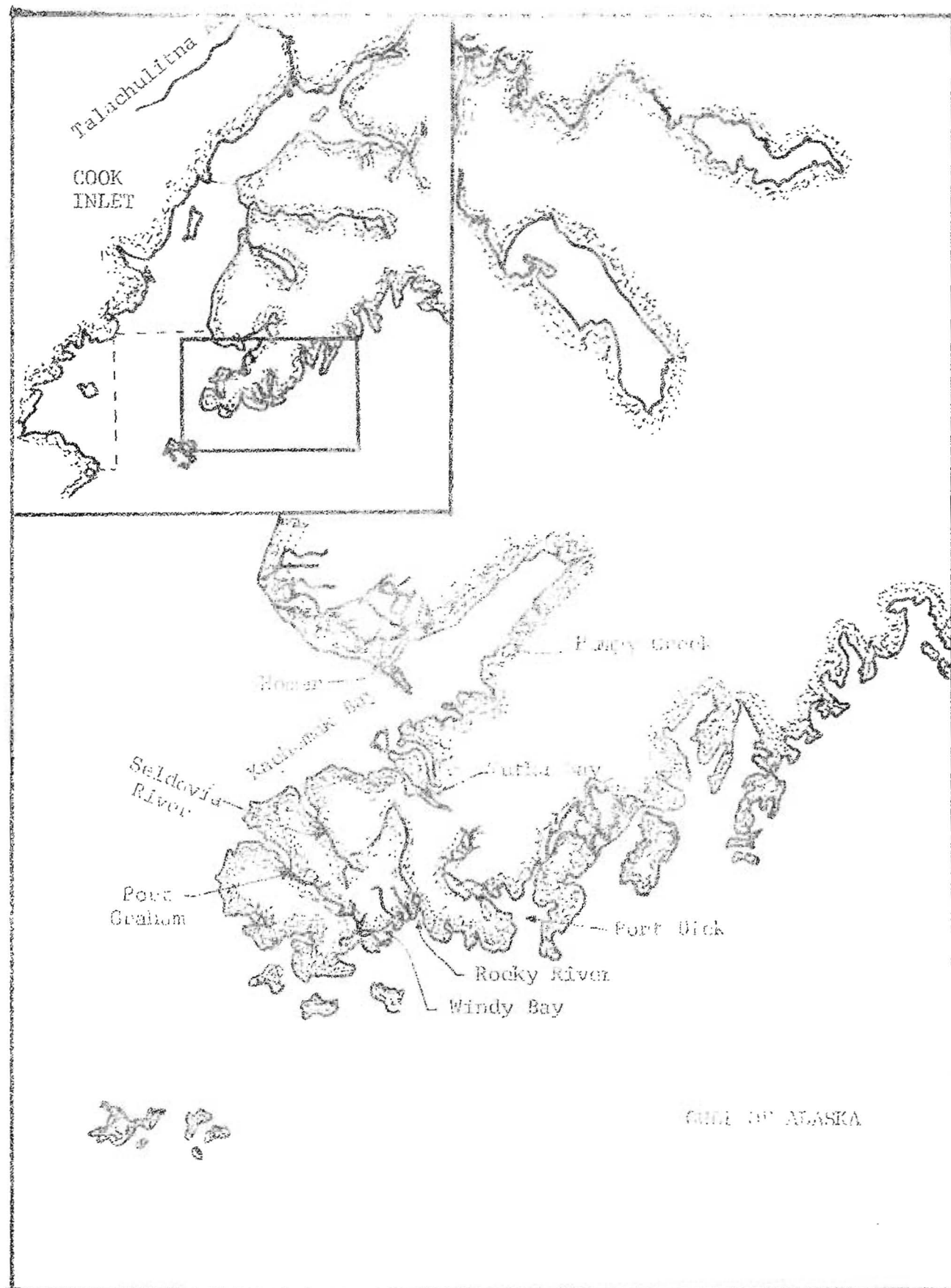


Figure 3. Cook Inlet, Alaska, showing the location of the study area.

TABLE 1. 1964 PINK SALMON ESCAPEMENT ESTIMATES ^{1/}
 SAMPLE STREAMS IN SOUTHERN AND OUTER DISTRICTS OF COOK INLET

Stream	On or before July 13	July 15	July 18	July 20	July 25	July 26	July 30	July 31	Aug 6	Aug 7	Aug 10	Best Escapement Estimate
Humpy Creek												18,500 ^{2/}
Tutka Bay			400		4,000				20,000		20,000	20,000
Seldovia		2,000	3,000	9,000		35,000		70,000	46,000			60,400
Port Graham	100	2,000						10,000	12,500			16,000
Windy Left	3,000	7,000		3,450					3,500			7,700
Windy Right			4,500	6,000					3,000			6,200
Rocky River		5,000			4,800				14,000		76,000	80,000
Port Dick Creek	6,000		15,000			7,000	20,000		11,000	14,000	30,000	31,500
Middle Creek											2,000	2,000
Island Creek			1,500				2,000			30,000		30,000
TOTAL												272,300

^{1/} Foot and aerial surveys by various observers.

^{2/} Weir count - 8,000 male, 10,500 female..

a weir count for Humpy Creek, the surveys were conducted either by aircraft or foot.

Best escapement estimates were determined by graphing the available daily counts of pink salmon and calculating the area under the graph. This figure was then divided by the estimated number of days the pink salmon spend in the stream, which is 24.5. The 24.5 figure was calculated by graphing daily stream counts on Humpy Creek in the stream above a weir. The total weir count for the season was divided into the area under the graph.

RESULTS

The effects of the land subsidence following the March 1964 earthquake on the ten pink salmon study streams of Cook Inlet are discussed in the Department publication, Post-Earthquake Fisheries Evaluation (Davis, 1965). It was observed in the majority of the study streams that pink salmon tended to spawn farther upstream following the land subsidence. This was caused by salt water covering a larger portion of the spawning area compared to pre-earthquake tide levels, thereby forcing the salmon upstream to freshwater covered riffles.

In the case of the Tutka Bay Lagoon stream, pink salmon previous to the earthquake spawned as far upstream as the water velocity allowed them. Following the land subsidence and subsequent loss of a portion of the intertidal spawning riffle, pink salmon were forced into a smaller spawning area.

In the other study streams where water velocity barriers are not apparent, salmon appeared to move into upstream reaches of the streams.

The Talachulitna River is a clearwater tributary of the glacial Susitna River. The entire 35 mile length of the river is utilized by pink salmon for spawning. Pre-emergent fry sampling was conducted in the spring of 1965 following the 1964 estimated escapement of one million pink salmon. Due to extensive ice coverage on the river, sampling was possible only in the upper few miles of the stream. Results of the upstream sampling are presented in Table 2. The sampling was conducted utilizing a four-place helicopter for transportation.

Pink salmon escapement, number of sample digs and mean number of fry per square meter on each of the study streams for the years 1962, 1963, and 1964 are presented in Table 2.

In 1962 and 1963 escapement counts indicate peak estimates of pink salmon and do not take into consideration recurring waves of spawners. The 1964 escapement counts were calculated as explained in the methods section of this report. The number of sample digs has been adjusted each year to provide

TABLE 2. PINK SALMON ESCAPEMENTS AND PRE-EMERGENT FRY OBSERVATIONS, 1962, 1963
AND 1964

	1962 RUN			1963 RUN			1964 RUN		
	Esc. Count	No. of Samples	Mean Fry Per Sq. Meter	Esc. Count	No. of Samples	Fry	Esc. Count	No. of Samples	Fry
Humpy	56,000	65	118.4	34,684	86	86.4	18,500	153	199.1
Tutka	30,000	13	139.9	10,000	26	72.3	20,000	55	195.8
Seldovia	50,000	28	231.4	15,000	35	84.3	60,400	95	284.1
Pt. Graham	50,000	45	279.9	2,000	--	----	16,000	50	242.1
Windy Left)	25,000	--	-----	4,500	--	----	7,700	50	100.1
Windy Rt.)				4,900	--	----	6,200	50	75.3
Rocky	200,000	--	----	12,000	26	0.0	80,000	87	131.3
Port Dick)	55,000	25	240.0	16,000	18	5.4	31,500	70	222.7
Island)		30	113.0	3,600	33	0.0	30,000	21	80.7
Middle)		--	-----	1,500	31	0.0	2,000	25	36.6
Talachulitna (Susitna Drainage)							60 ^{1/}		234.78 ^{1/}
Totals or Means	466,000	206	184.4	97,684	255	47.8	272,300	656	180.9 ^{2/}

^{1/} Not included in total.

^{2/} Figure weighted by number of samples in each stream.

better sample coverage of the utilized spawning area. The mean number of fry per square meter is the average for the utilized spawning area in the sampled streams.

Table 3 lists the streams, sampling dates and number of gravel shift and freezing level setups for each stream studied during the winter of 1964-65. Seldovia River experienced some minor gravel shift in the upper portion of the intertidal zone. Average pre-emergent fry densities were observed in the area of gravel shift.

One shallow riffle in the upper intertidal zone of Port Graham River had fry mortality apparently from freezing. The freezing vials in the riffle area were all broken and pink fry removed from the gravel were dead. This one riffle area was the only portion of the stream where fry mortality was observed.

TABLE 3. STREAMS, SAMPLING DATES AND NUMBER OF GRAVEL SHIFT AND FREEZING LEVEL SETUPS FOR 1964-1965 WINTER.

Stream	Number Setups	Planting Date	Recovery Date	Results
Humpy Creek	30	10/14/64	3/29/65	Indicators showed no gravel shift or freezing.
Seldovia River	20	10/13/64	3/25/65	Gravel shift occurred in upper IT zone, (4-6 inches deposited over setup). Indicators showed no freezing.
Port Graham	20	10/15/64	3/7/65	Ping pong indicators showed no gravel shift. Fry mortality occurred in upper intertidal zone, freeze vials in area all broken.

DISCUSSION AND CONCLUSIONS

Table 4 summarized the pink salmon catches, escapements, and pre-emergent fry abundance averages in the study area, 1962, 1963, and 1964. The pre-emergent fry density for the 1964 spawning year is slightly lower than the fry density for the 1962 spawning year.

Since the 1962 fry density of 184.4 yielded a return of 1,306,185 pink salmon, it is estimated that the 1964 fry density of 180.9 will proportionately

yield a return of 1,300,000 pink salmon to the Southern and Outer districts in both catch plus escapement.

TABLE 4. SUMMARY OF PINK SALMON CATCHES, ESCAPEMENT AND PRE-EMERGENT FRY ABUNDANCE RATIOS IN THE STUDY AREA, 1962, 1963 AND 1964.

Spawning Year	Catch	10-Stream Esc. Index	Pre-emergent Fry Density Sq. Meter Means	Return 10-Stream Catch and Esc.
1962	2,113,570	466,000	184.4	1,306,185 (1964)
1963	121,026	97,684	47.8	255,000 (1965)
1964	1,033,885	272,300	180.9	1,300,000 (1966) ^{1/}

^{1/} Estimated forecast of 1966 catch plus escapement.

The estimated distribution of the catch plus escapement for the various bays in the Southern and Outer districts is presented in Table 5. The number of square meters indicates the actual area utilized by pink salmon in the streams.

The estimate of the return to individual bays is based on the average percent return from the fry outmigration from the 1962 and 1963 parent years for all bays except Windy and Rocky Bays. Data from previous years' fry outmigration is not available for these bays; therefore, return estimates were made from even-year catch plus escapement averages. The Port Dick Bay streams, Port Dick Creek, Island Creek, and Middle Creek, were grouped together for this estimate since catch figures are not separated within the bay.

The 1963 parent year fry sampling in Port Dick streams indicated low levels of fry abundance within the sample area. The sample area had been affected by the tsunami following the Good Friday earthquake. It is apparent from the 1965 return that pre-emergent fry sampling had not covered utilized spawning areas. The sample areas on these streams has been adjusted accordingly.

TABLE 5. PINK SALMON FRY DENSITY - RETURN RELATIONSHIPS WITH ESTIMATED 1966 RETURN

Parent Year	Fry Density	Outmigrating Fry	Year	Catch	Return Escapement	%
<u>Humpy Creek - *19,700 m²</u>						
1962	118.4	2,332,480	1964	53,535	18,500	3.08
1963	86.4	1,702,080	1965	6,707	28,000	2.04
1964	199.1	3,922,270	1966	(Calculated)	100,000	
<u>Tutka Lagoon - *4,600 m²</u>						
1962	139.9	643,540	1964	100,935	20,000	18.7
1963	72.3	332,580	1965	44,599	20,000	19.4
1964	195.8	900,680	1966	(Calculated)	171,000	
<u>Seldovia River - *12,000 m²</u>						
1962	231.4	2,776,800	1964	37,357	60,400	3.52
1963	84.3	1,011,600	1965	18,941	30,000	3.85
1964	284.1	3,409,200	1966	(Calculated)	119,000	
<u>Port Graham - *8,000 m²</u>						
1962	279.9	2,400,000	1964	36,402	16,000	2.18
1963	-----	-----	1965	10,060	1,500	
1964	242.1	1,936,800	1966	(Calculated)	42,000	
<u>Windy Bay (2 streams) - *9,400 m²</u>						
1962	-----	-----	1964	68,567	13,900	
1963	-----	-----	1965	5,435	12,000	
1964	87.7	824,380	1966	(Estimated)	70,000 ^{1/}	
<u>Rocky River ^{2/}</u>						
1962	-----	-----	1964	53,186	80,000	
1963	0.0	-----	1965	141	300	
1964	131.3	-----	1966	(Estimated)	100,000 ^{1/}	

* Utilized spawning area

^{1/} Estimated from catch plus escapement data

^{2/} Utilized spawning area not measured

TABLE 5. PINK SALMON FRY DENSITY - RETURN RELATIONSHIPS WITH
ESTIMATED 1966 RETURN (Continued)

	PARENT YEAR 1962		1964 RETURN	
	<u>Fry Density</u>	<u>Outmigrating Fry</u>	<u>Catch</u>	<u>Escapement</u>
Port Dick Creek, *7,600 m ²	240.0	1,824,000		31,500
Island Creek, *3,600 m ²	113.0	406,800		30,000
Middle Creek, *1,500 m ²	176.0	264,000	524,883	2,000
TOTAL		2,494,000		2

	PARENT YEAR 1963		1965 RETURN	
	<u>Fry Density</u>	<u>Outmigrating Fry</u>	<u>Catch</u>	<u>Escapement</u>
Port Dick Creek	5.4 <u>1/</u>	41,040	15,337	50,000
Island Creek	0.0 <u>1/</u>	-----	-----	500
Middle Creek	0.0 <u>1/</u>	-----	-----	500

	PARENT YEAR 1964		1966 RETURN (Calculated)	
	<u>Fry Density</u>	<u>Outmigrating Fry</u>	<u>Catch</u>	<u>Escapement</u>
Port Dick Creek	222.7	1,692,520		
Island Creek	36.6	131,760		
Middle Creek	80.7	121,050		
TOTAL		1,945,340		459,000

* Utilized spawning area

1/ Sampling conducted following earthquake. Sample area had been affected by tsunami.

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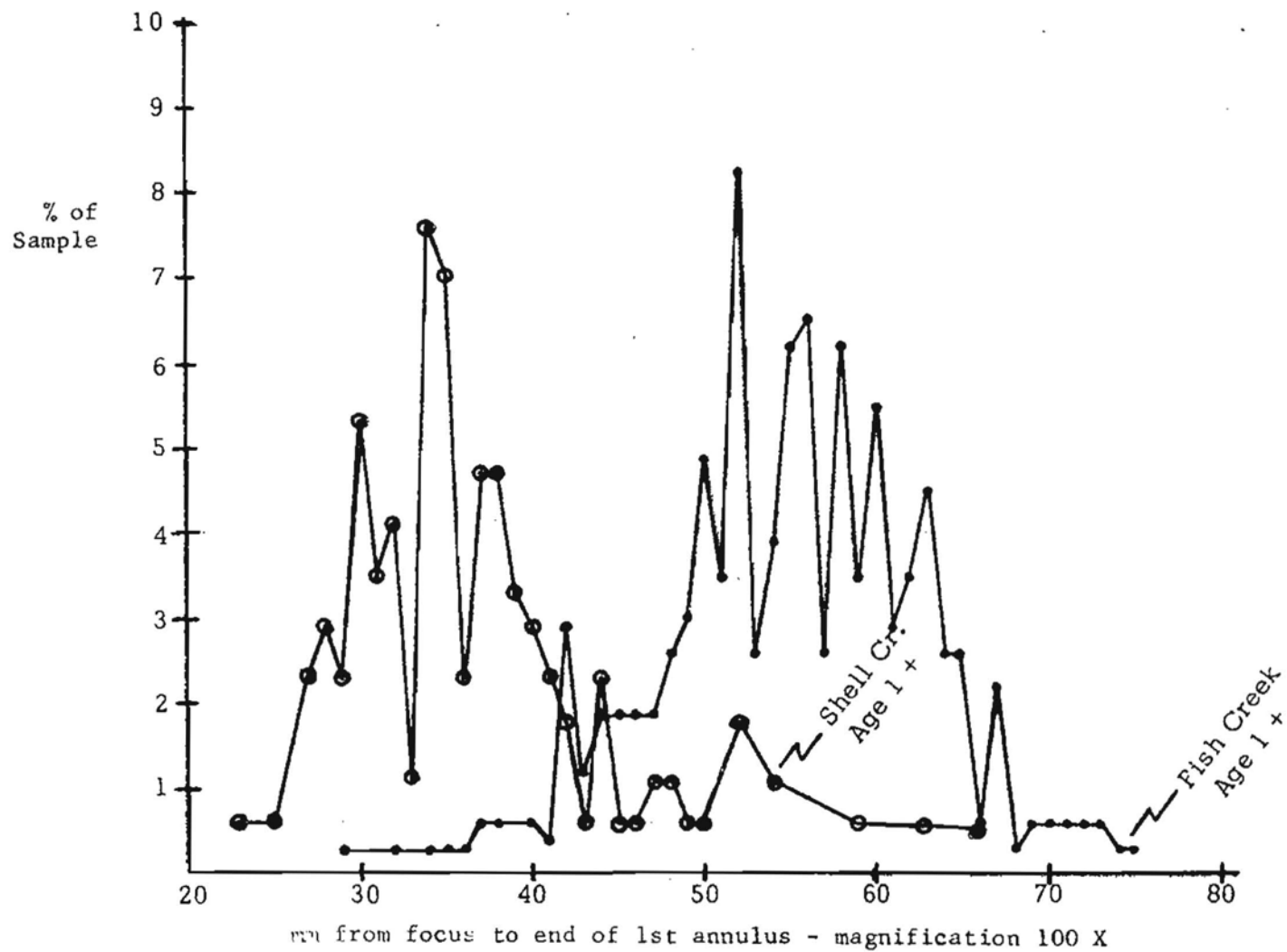
RED SALMON SMOLT STUDIES

In order to determine racial characteristics for various spawning populations of red salmon, it is necessary to collect samples of the downstream migrant population from each race. Trapping was attempted on the following drainages with no success: Russian River, Kenai River, Kasilof River, Bulchitna River, Talachulitna River, and Susitna River. Downstream migrant trapping was successful on two systems in 1965, namely Fish Creek on Knik Arm and Shell Lake in the Susitna drainage.

The scales from the samples were mounted and magnified 100 X on measuring papers. Measurements of the following characteristics were taken and recorded: total length, total circuli count, annulus length for each year, circuli count for each annulus, plus growth length and plus growth circuli. The following table shows comparison of Shell Lake first annulus growth to Fish Creek first annulus growth.

When a large enough number of the races of Cook Inlet reds have been captured and identified it will be possible to distinguish them when they return as adults. Migration patterns of returning races will be determined and the harvest can be regulated by protecting migration areas of weak races.

DIFFERENCE IN SCALE GROWTH BETWEEN SHELL LAKE AND FISH CREEK AGE 1+ RED SALMON SMOLTS



KENAI-KASILOF TEST FISHING

Due to the silty condition of the Kenai and Kasilof Rivers it is necessary to estimate escapement levels and timing by test fishing. The gear used during the 1965 test fishing program was the same as in the past three years: red salmon gill nets, 72 feet long, 10 feet deep, 5½ inch mesh.

The fishing sites on the rivers are located within the intertidal zone. Fishing time is regulated by the tides, and fishing is conducted in the one hour period before flood tide.

TEST FISHING RESULTS ON THE KENAI

Few red salmon were taken on the Kenai River when test fishing commenced June 20, though on the 21st a small influx occurred, which abruptly dropped off. The early run of fish peaked about June 14. Commercial fishing in Cook Inlet for the drift and set net fishery was opened June 24, and test catches remained low from this date until the main run started to move in July 3.

Numbers of test fish peaked to 64 reds per hour on July 4, then dwindled until July 15, when a lesser build-up was apparent. Test net catches dropped off abruptly after July 15, then increased to a peak of 330 reds per hour on July 26, followed by a lesser influx on August 3. After August 3, very few red salmon were taken in the test fishing.

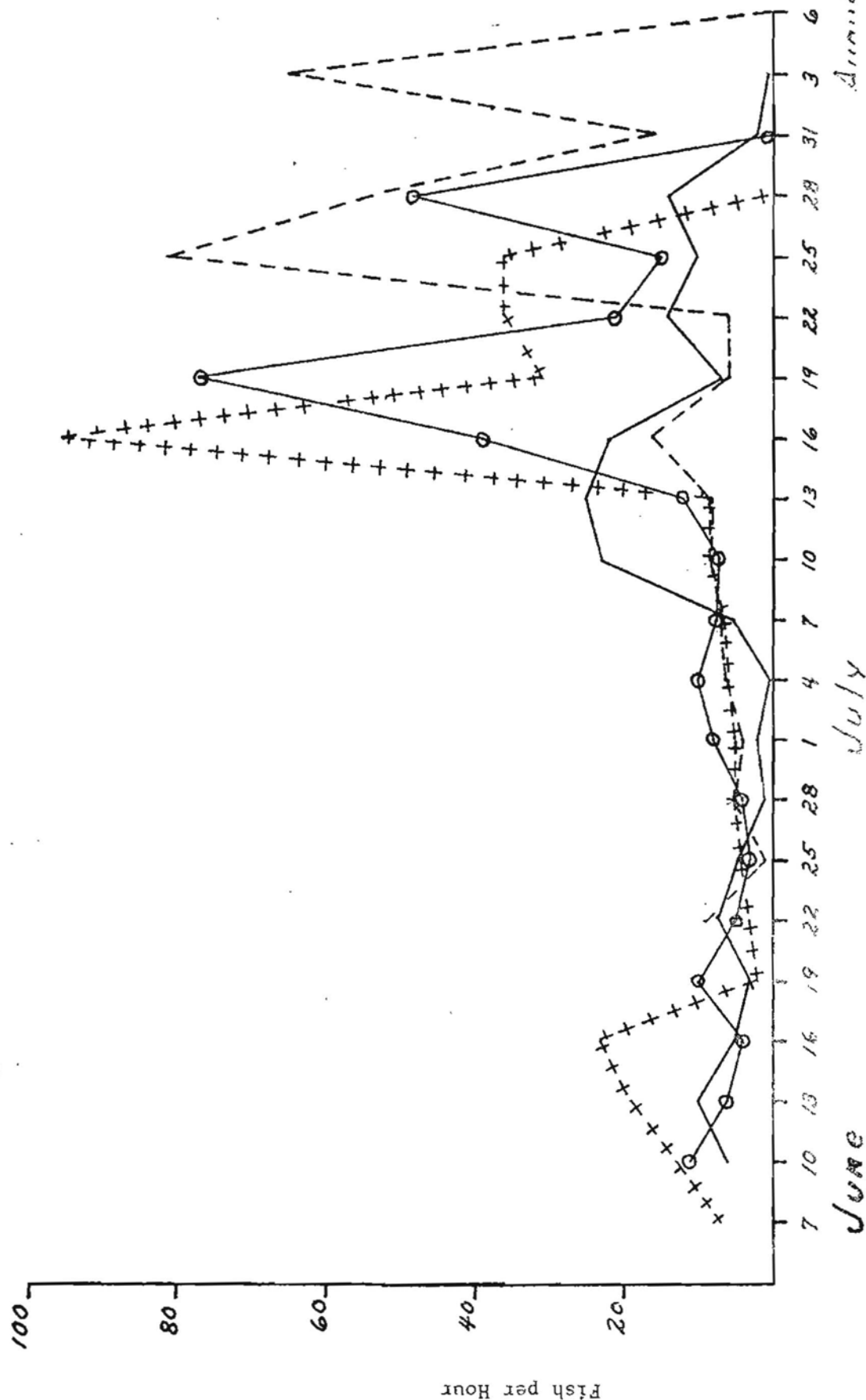
The peaks in the 1965 red salmon run compare favorably with previous years as to date; however, the total numbers of fish taken was higher. In comparison to previous years' test net catches, the Kenai River could be said to have had adequate red salmon escapement.

Pink salmon hit the Kenai in very few numbers starting July 4, and catches remained very low throughout the test fishing period. When pinks were caught, their numbers did not exceed one per hour.

1962 ○—○
 1963 + + +
 1964 —
 1965 - - -

TEST NET CATCHES OF RED SALMON, KENAI RIVER 1962-1965

3 Day Average



Test fishing was concluded on August 9; however, no pinks had been taken since July 15.

Fifty-two king salmon were taken on the Kenai River during the 1965 test fishing period, which is 31 more than were taken in 1964. Silver salmon were first taken on July 5, but their numbers in the test catch remained low and sporadic until early August, when they increased slightly. No chum salmon were taken.

Twenty-two Dolly Varden were caught from mid-July until early August.

TEST FISHING RESULTS ON THE KASILOF RIVER

Test fishing on the Kasilof River commenced June 20 and ended August 8.

Red salmon catches began June 20 and increased to 34 per hour on June 27, after which their numbers dwindled until July 4, when a peak of 132 per hour was recorded. Test catches of reds again declined until a small build-up occurred on July 25. No red salmon were taken in the test fishing after August 4.

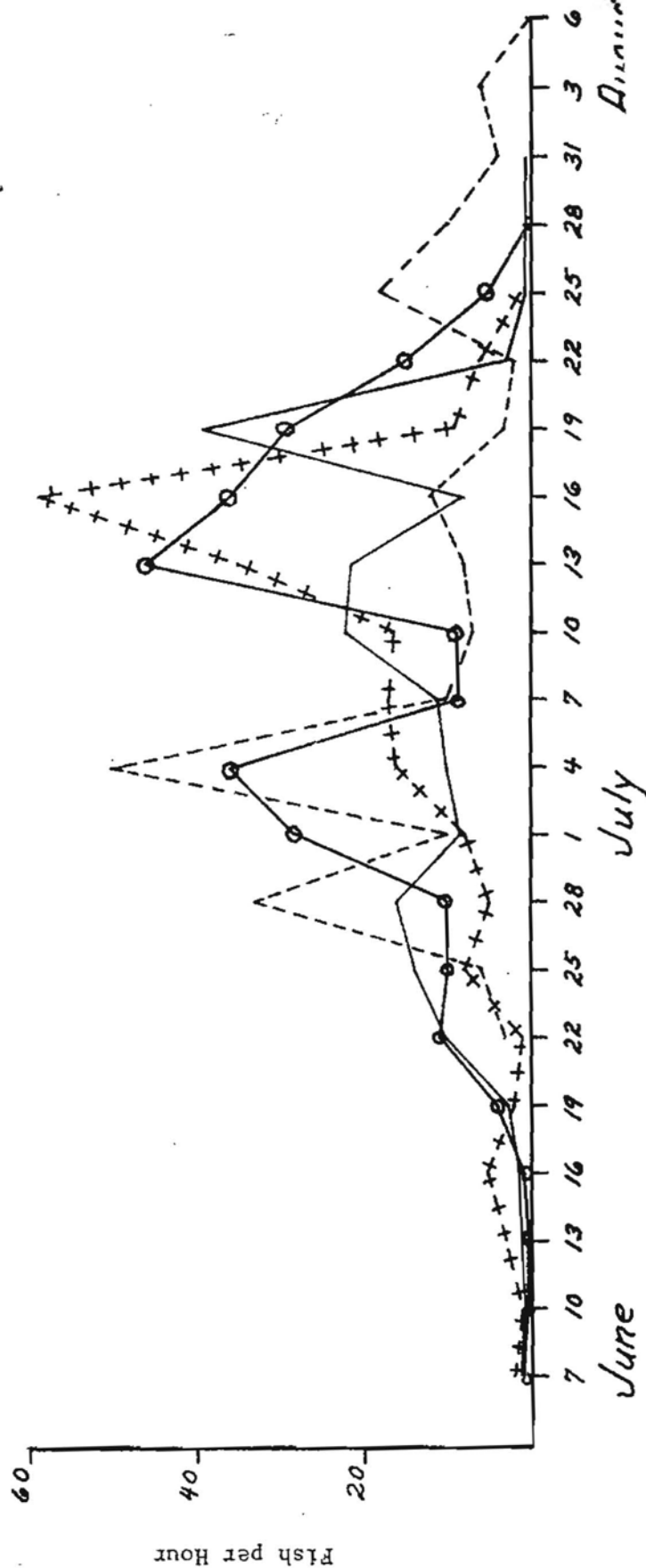
Pink salmon catches in the test net were very slight and the results were similar to those obtained on the Kenai River.

Sixty-five king salmon were taken in the test net during June, July, and August, but silver salmon were few in number and did not appear more frequently than two per hour. No chum salmon were taken.

One steelhead was caught on June 25.

TEST NET CATCHES OF RED SALMON, KASLOF RIVER 1962-1965

1962 ○—○
 1963 +—+
 1964 —
 1965 - - -



NORTHERN DISTRICT

Three test fishing sites and one counting tower were utilized for gathering data on salmon in the Northern District during 1965. Daily catches were of value in managing the upper Cook Inlet fishery. The three test fishing sites are located in such a manner as to provide data on salmon as they enter the middle of the Northern District (Chuit River Site), as they reach the mouth of the major salmon stream (Susitna Mouth Site) and as they pass out of the commercial fishery (Susitna River Site). The counting tower located at the mouth of Fish Creek, Knik Arm, provided red salmon data on one of the major red salmon streams.

Data on peak catches from the three test fishing sites for 1965 show that the Northern District run of red, coho, chum and pink salmon was small, of short duration, and that the fish moved rapidly through the fishery.

TEST FISHING SITE

PEAK CATCHES

Chuit River	July 24-25 and *August 2-3
Susitna Mouth	July 25-26
Susitna River	July 25-26 and August 3-4

*Run noted by temporary employee on Chuit Beach.

During 1965 the Northern District experienced one of its worst commercial fishing seasons. A combination of factors brought this about. On a 6-year average, pink salmon constitute the bulk of the catch, 42%; reds follow with 21%; then coho with 19%; and chums at 16%. 1965 being an "off-year", very few pinks were taken, as expected. Coho salmon also show a tendency to be cyclic with odd numbered years having smaller runs. The 1965 silver run was especially small. Chum runs, which have been on the increase over past years, failed to materialize in the Cook Inlet as well as

in Alaska and Canada. The Northern District red salmon run was weaker than expected, but past escapement data from Fish Creek in 1957 and 1961 showed small runs. Thus it was not a complete surprise that the Northern District red run was small. Stream surveys conducted during August and September substantiated the test fishing data. No stream was observed that had good escapement.

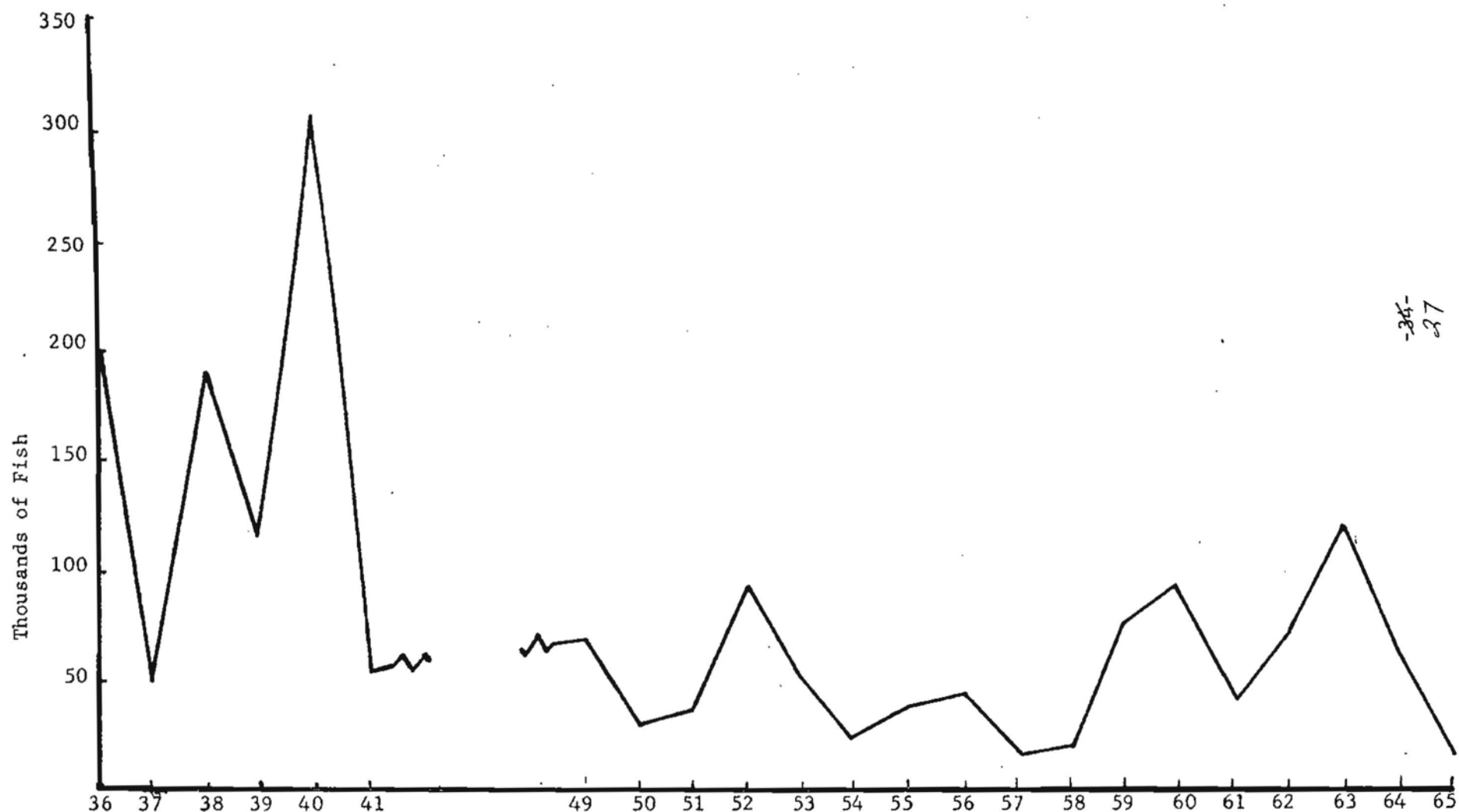
FISH CREEK COUNTING TOWER

The total estimated salmon escapement into Fish Creek on Knik Arm was calculated from tower counts for the period of July 1 through August 8. The red salmon escapement was estimated at 16,544. This escapement is the lowest since 1957 (see figure "Fish Creek Red Salmon Counts, 1936-1965").

The method of estimation is as follows: One 15 minute count is taken every hour for a 12 hour period, and then 16 hours are passed before the next 12 hour sequence of counts. The actual count figure is multiplied by eight to project the total estimated escapement.

FISH CREEK RED SALMON COUNTS *

1936-1965



42-48 incomplete

*1936-1959 U. S. Fish and Wildlife Records

*1960-1965 Alaska Dept. of Fish and Game

-34-
27

KING SALMON

For the third consecutive year the Susitna Test Fishing program was conducted in Upper Cook Inlet's most productive salmon producing system for the purpose of gathering king salmon data. The program commenced May 19, 1965.

The king salmon spawning migration past the Susitna test fishing site during 1965 was characterized by one distinct peak which occurred from June 2 to 12. Ninety-two per cent of the king run entered the Susitna River in June 7 per cent in May and 1 per cent in July. In addition, 97 per cent of the Susitna king run escaped into the Susitna River prior to the June 24 commercial fishery opening date.

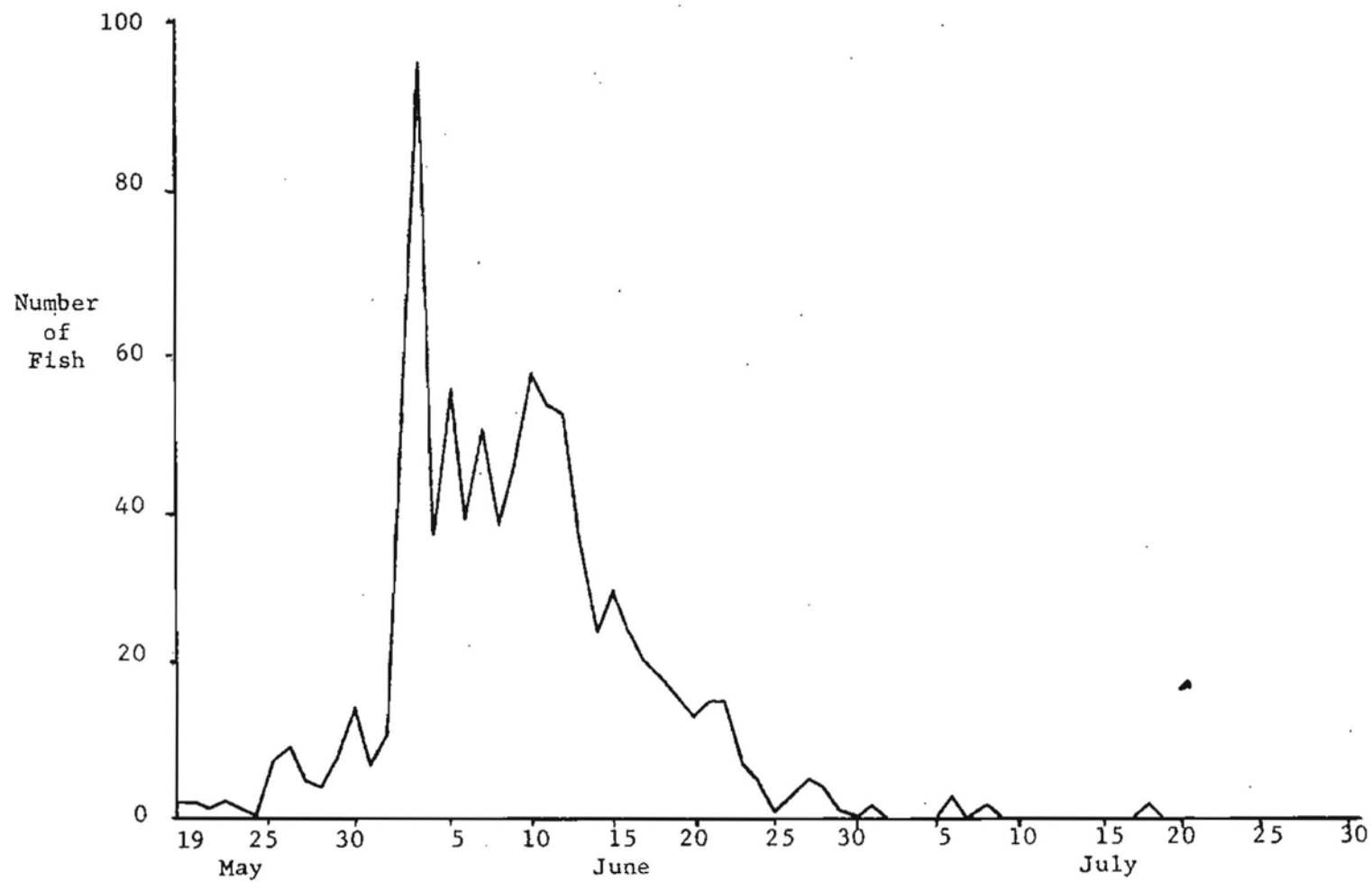
Males were dominant during May and averaged 10 pounds; females averaged 20 pounds. During June the sex ratio was about equal; males averaged 12 pounds females averaged 20 pounds. During the peak of the run, both sexes were slightly larger; males 14 pounds, females 21 pounds.

A king salmon tagging program was initiated this year to obtain data on timing to various tributaries. Kings caught in the gill nets were immediately tagged and released, if they were not hurt. A total of 362 kings were tagged, but subsequent recoveries were hindered by inclement weather which proved to be such a problem that no conclusions could be made from the tagging.

King salmon taken by the Susitna Test Fishing crew that were too weak to be tagged were either flown fresh, or were filleted, salted, and put in kegs and flown to the Tyonek Indian village. The latter process was necessary when weather conditions made the delivery of fresh fish impossible.

It is imperative that the Susitna king salmon test fishing and tagging program be continued during 1966. The data from test fishing, combined with aerial and ground surveys by Sport Fish and Commercial Fishery biologists are the only index now available on the past and future status of the Susitna king salmon resources.

SUSITNA RIVER KING SALMON DAILY CATCH DATA FOR 1965



-26-
-29-

COMMERCIAL FISH TEST FISHING, SUSITNA BASIN, KING SALMON, 1965

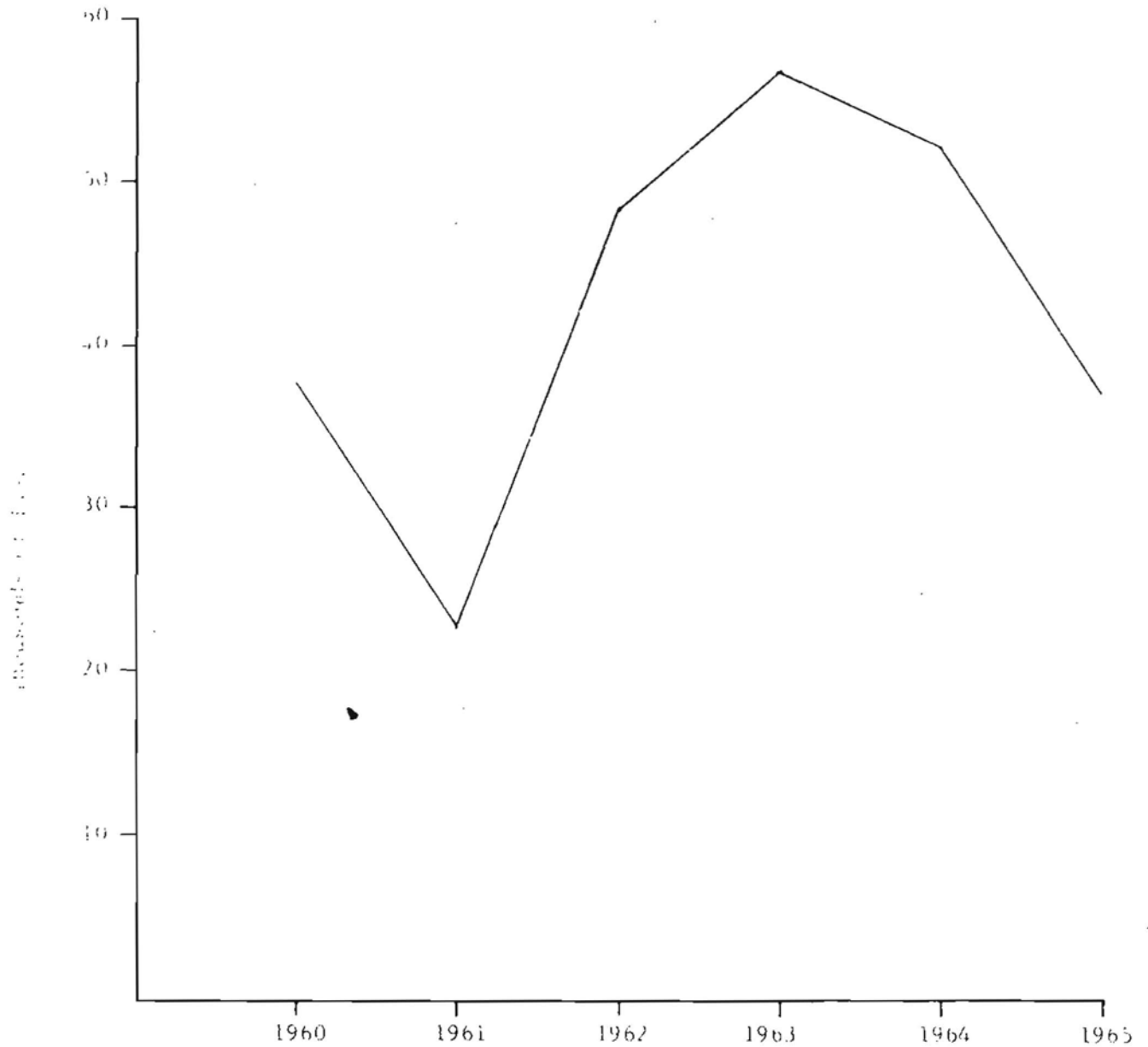
MONTH CAUGHT	NUMBER	PER CENT
May	62	7.2
June	796	91.8
July	<u>9</u>	<u>1.0</u>
Totals	867	100.0
June 24 to July 31	28	3.2

The June 24 opening allowed approximately 97% escapement into the Susitna River before commercial salmon season opened.

RUSSIAN RIVER COUNTING TOWER

A counting tower has been maintained on the Russian River since 1960. The total escapement is estimated by the same method used at Fish Creek. The 1965 estimate of 37,152 red salmon escapement is below the six year average for the

RUSSIAN RIVER RED SALMON COUNTS - 1960-1965



FRITZ CREEK

Previous annual reports have detailed the history of transplants into Fritz Creek. Briefly, in 1961, 1962, and 1963, adult pinks were transplanted into Fritz Creek from nearby China Poot.

A return of 185 adults was recorded in 1963 - the apparent result of the 1961 transplant. This count is fairly accurate, for the fish were netted and lifted over a fence built in the stream mouth.

In 1964, the estimated return was over 100. No fence was constructed, and the return was estimated from counts of fish seen in the stream during ground surveys.

In 1965, the count was 6 pinks: 3 males and 3 females.

SUBSISTENCE FISHING

A total of 190 permits for salmon subsistence fishing were issued during 1965. Of these permits, 162 people returned reports on fish caught. Of these, 45 did not fish on their permits, 113 caught 50 fish or less. Four persons reported catching over 50 fish: two caught 51, one caught 52, and one caught 75 on a special permit allowing 100 fish to be taken.

The table below gives the total catch, by species, reported taken by subsistence fishing permittees:

KINGS	REDS	COHOS	CHUMS	PINKS	OTHER	TOTAL
0	484	2,109	285	49	1*	2,928

*Steelhead

KING CRAB

During 1965, the Kachemak Bay District was the largest producer of king crab in Cook Inlet, on a year round basis, as opposed to the Kamishak Bay District, which led production from 1962 through 1964. A reduction in total yield from Cook Inlet during 1965, compared to previous years, is attributed to decreased fishing effort due to transference of fishing gear to Kodiak Island, and unfavorable weather conditions.

KACHEMAK BAY DISTRICT

This year the Kachemak Bay king crab fishery produced approximately 1,811,022 round pounds of king crabs, or about 65% of the total Cook Inlet production. This catch was 4.6% above the 1964 Kachemak Bay production. Of particular interest was an increase in average weight of landed crab. From 1960 through 1964 there was a reduction in average weight of approximately 1.34 pounds, but during 1965 the average weight increased by 0.35 pounds. The following table shows king crab landings and average weights from 1960 through 1965.

KING CRAB CATCH STATISTICS

YEAR	KAMISHAK BAY		AVERAGE WEIGHT	KACHEMAK BAY		AVERAGE WEIGHT
	CRAB	POUNDS		CRAB	POUNDS	
1960	No Fishing			455,000	4,219,776	9.20
1961	139,300	1,205,679	8.60	349,783	2,988,880	8.50
1962	473,601	4,305,444	9.09	240,852	1,968,980	8.17
1963	635,225	5,538,349	8.71	330,146	2,667,279	8.08
1964	586,010	4,934,366	8.42	220,326	1,731,577	7.86
1965	108,019	963,412	8.92	220,455	1,811,022	8.21

KAMISHAK BAY DISTRICT

The figures from Kamishak Bay show the same general trend as do those from Kachemak Bay relative to average weight. That is, there has been a steady yearly decrease in average weights from 1962 through 1964, resulting in a total reduction of just over one-half pound, but the average weight during 1965 increased by 0.50 pounds.

Since less than one-fifth as many king crabs were taken from the Kamishak Bay area during 1965 as in 1964, no conclusions can be made as to the significance of the average weight increase. However, the 1965 increase in average weight of Kachemak Bay area king crabs over previous years may indicate evidence of optimum yield.

The king crab fishery in Cook Inlet is probably indicative of the trend of the entire Alaska king crab fishery in years to come. With increased and/or sustained fishing effort the average size and weight of king crabs will be reduced until the minimum legal size has been reached. Thereafter, the size and duration of the fishery will depend upon the strength of the age class being fished. It appears quite likely that this particular type of fishery is rapidly approaching for Kachemak Bay, and may not lie too far in the future for Kamishak Bay.

No landings of king crabs were made from the Outer District.

DUNGENESS CRAB

A limited crab tagging program was initiated in the main crab fishing areas of Kachemak Bay and Port Graham Bay in the spring and summer of 1963. The majority of the returns were obtained in 1963, but four tags were collected during the fishery of 1964 and two in 1965. These last six tags were recovered in the same location as they had been released.

Data from the tagging program suggest that some portion of the crabs living in the bays are stationary and do not migrate from bay to bay.

Due partly to minimum effort and partly to lack of processing facilities the Cook Inlet catch for Dungeness crab in 1965 was considerably reduced from previous years. The number of individual crabs and poundage for the years since 1960 are shown below.

DUNGENESS CRAB CATCH, COOK INLET AREA

YEAR	CRAB	POUNDS
1960	No fishery	
1961		191,588
1962	204,573	460,725
1963		1,677,204
1964	177,708	421,452
1965	32,378	82,280

SHRIMP

The effects of the March 27, 1964 earthquake tsunami was still responsible for limited shrimp processing facilities during 1965. One shrimp plant operated in the Cook Inlet area, at Homer. Landings for trawler caught shrimp from Cook Inlet for 1965 amounted to 62,157 pounds. These were taken entirely from Kachemak Bay. -36-

SEISMOGRAPHIC EXPLORATIONS, COOK INLET

During 1965 permits were issued for 11 land, 1 tidewater, 5 conventions marine, 3 gas exploder, 2 gelatin, 2 drill casing, and 1 non-explosive operation in the Cook Inlet Area. Inspections of the land work were made on a time-available basis, no inspections were made of the gas exploder work, and a biologist-observer was present during each shot exploded during the marine operations. Summaries of reports of each of the three marine operations are included here.

Seismic Permit 65-122-CI

April 15 - May 15

Area: North of latitude of Anchor Point

April 15 - June 1

Area: South of latitude of Anchor Point

Geophysical Service Inc., contractor for Union Oil Company
of California

Observer: Donald Stewart

Four vessels were used: the Royal Lady, 36'; Thomas J, 59"; Oceanic, 80'; and Sitkin, 135'. The first three are normally used for king crab fishing; the Sitkin is a converted L.S.T. Explosive used was nitro-carbonate, maximum weight 100 pounds. Dead fish actually observed from the operation included 855 tomcod, 53 Pacific cod, and 115 herring. At no time during the operation did the observer have to stop or slow operations due excessive damage to fish life.

Seismic Permit 65-123-CI and 65-127-CI

May 10 - June 1

Area: Between West Foreland and Chinitna Point

United Geophysical Corporation, contractor for Atlantic
Refining Company.

Observer: Charles Martin and Francis Flavin

Four vessels were used: the Violet Ray, 70'; Robert M, 80'; Sunrise, 80'; and the Gismo, 45'. The first three are normally used for crab fishing; the latter is a military type landing barge. Explosive was nitramon and only 50 pounds maximum could be used as larger charges had damaged the Robert M. Dead fish actually observed from the operation included 781 tomcod and 58 herring. At no time during the operations did the observer have to stop or slow operations due to excessive damage to fish life.

Seismic Permit 65-130-CI

August 15 through December 31

Area: Cook Inlet

Geophysical Service Inc. and their various clients

Observer: James Scarborough

Three vessels were used: the Sitkin, 135'; Grebe, 110'; and Warbler, 110'. The latter two boats are converted submarine chasers. Explosive used was nitro-carbo-nitrate and nitramon. The majority of the shots were limited to 100 pounds, but a maximum weight of 750 pounds was allowed with special permission. Dead fish actually observed from the operations included 2,154 tomcod, 334 herring, 1 grey cod and 1 Dolly Varden. At no time did the observer have to stop or slow operations due to excessive damage to fish life.

Seismic Permit 65-137-G

November 15 - December 31

Area: Gulf of Alaska

Geophysical Service Inc., contractor for Texaco, Inc.

Observer: James Scarborough

The vessels were the same as used in Permit number 65-130-CI. Explosives used was nitramon, maximum weight 100 pounds, except permission granted for larger amounts for special purposes. Dead fish actually observed from the operation included 53 rockfish, 19 whiting, 11 red snapper, 5 grey cod, 2 sea bass and 2 herring. At no time during the operation did the observer have to stop or slow operations due to excessive damage to fish life.